

NEWS SUMMARY

GENERAL

Hopes of finding scientists' trade

search by a Chilean aircraft in three British scientists missing in the Antarctic had to be cancelled yesterday because of bad weather.

The British Antarctic Survey said: "The chances of finding them are now extremely slim."

They are John Coll, 23, a test mechanic from Glasgow, and Rose Morgan, 22, a radio operator from Peterfield, Hants. Kevin Ockleton 22, a physicist from Keyingham, near Hull.

Kenya security Kenya's President Daniel arap Moi moved to reorganise the security forces after the abortive August 1 military coup.

Sublin protest Dublin protesters to Britain about shots fired from a Royal Navy launch at a yacht carrying eight children aboard that refused to stop in an inlet trading the border with Jersey last week.

Mercenary claim The Defence Ministry rejected reports that U.S. mercenaries fought with Argentine troops in the Falklands, saying there may have been American-speaking soldiers.

Fires still blazing Three forest fires that ravaged 7,000 acres near St Tropez, southern France, since Saturday were still burning.

Seychelles flights British holidaymakers stranded in the Seychelles by the recent coup attempt are due home today after the resumption of scheduled flights.

Scillies air link The Trade Department gave £80,000 to the Scilly Isles council to take over the airport and save the air link with Cornwall.

Festival closed Organisers asked Los Angeles police to close a festival at Watts, a black suburb where 85 died in rioting in 1967, following looting and fighting.

Child 'protection' Tory MP Geoffrey Dickens plans to introduce a Bill to protect children by banning organisations such as the Paedophilia Information Exchange.

Promotion Seaside resorts, hit by the recession and changing holiday patterns, are to sell themselves through travel agents next year.

Briefly... Lord Shinwell, 97, was under hospital care in a London hospital's coronary unit.

The Voice, a weekly London newspaper for blacks, will go on sale at the Notting Hill Carnival on August 28, Page 5.

Vaccines against pasteurised, the main killer disease of sheep, were launched by Hoechst.

British Medical Association meets in Worcester on September 9-11 to celebrate its 150th anniversary.

India's Prime Minister Indira Gandhi starts a five-day tour of Mauritius and Mozambique today.

King Sobhuza of Swaziland died aged 83.

BUSINESS

Schmidt warns of trade war

WEST GERMAN Chancellor Helmut Schmidt has warned that U.S.-Europe trade disputes could lead to a trade war, returning the West to the conditions of the 1930s.

IMF advances outstanding rose by a third, and its operational income doubled in the year to April 30.

BANK OF FRANCE sold D-marks on Friday as part of its measures to prop up the weakening franc. The French currency remained comfortably placed around the middle of the European Monetary System, but came under renewed pressure from Thursday onwards on rumours of possible withdrawal from the system.

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PLO evacuation from Beirut resumes after blockade 'hitch'

By Patrick Cockburn in Jerusalem and Reginald Dale in Washington

THE EVACUATION of members of the Palestine Liberation Organisation from Beirut resumed last night after several tense hours in which Israeli gunboats blockaded the harbour.

The vessels stopped the departure of a ship carrying more than 1,000 PLO men to Cyprus.

The Israelis said the PLO had loaded 18 jeeps onto the ship, contrary to the terms of the evacuation plan drawn up by Mr Philip Habib, the U.S. special envoy.

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The U.S. reacted calmly to the hold-up in the evacuation. In Washington, Mr Caspar Weinberger, the U.S. Defence Secretary, described the problem as a "little hitch," a sort of lawyers' dispute.

Mr Weinberger said that the Israelis had "no basic right" under the evacuation agreement to block the ship's departure.

The port area was meant to be in the hands of the French peace-keeping force, he said.

The problem was that Jeeps were not specifically mentioned in the evacuation agreement, Mr Weinberger said. The PLO interpreted this to mean that they could take them, the Israelis that they could not.

Syrian control. An Israeli soldier wounded in a clash with the PLO on Saturday died yesterday and three members of a PLO squad were killed in a separate incident east of Beirut.

In addition, five Israeli soldiers were wounded in an ambush north of the port of Tyre, just above the southern of Beirut late yesterday afternoon.

Israel is extremely worried by guerrilla attacks by units of the PLO operating from behind Syrian lines, an Israeli spokesman said yesterday.

The Israeli army to identify all the PLO members leaving Beirut seems to be causing the government in Jerusalem less concern, although it has protested at this violation of the terms of the evacuation plan to Mr Habib.

The Israelis say the Syrians are heavily reinforcing their troops in the Bekaa where about 7,000 PLO troops are also stationed.

Meanwhile, the Israeli Cabinet set yesterday that it will soon produce a scheme for general Middle East peace, but will not examine anything which deviates from the Camp David accord.

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Vatican to resist claims on its funds

By Rupert Cornwell in Rome

THE VATICAN has indicated that it will resist demands by the Italian authorities that it should cover fully more than \$1.2bn (£700m) of loans issued by the collapsed Banco Ambrosiano group to Panama-based companies, on the strength of letters of patronage issued by the institute per le Opere di Religione (IOR), the bank of the Holy See.

This first public pointer to the Vatican's attitude to the Ambrosiano scandal comes from Cardinal Agostino Casaroli, the Vatican's Secretary of State, in an interview in the forthcoming issue of the magazine L'Espresso.

The controversy over relations between the now liquidated Banco Ambrosiano and the IOR hinges on the nature of the guarantees represented by a letter of patronage.

Failure to recover the Panamanian loans lay behind Ambrosiano's collapse.

According to experts, said Cardinal Casaroli, "the tone of these letters, which are part of standard banking practice, is such as not necessarily to imply a full obligation. I think there are limits to the commitment many people think the letters involve."

The whole question is being examined by the team of three appointed by the cardinal in mid-July. Their report, he says, will be ready "before the autumn."

Cardinal Casaroli also claimed that the total sum involved was less than \$1.2bn. "From what has emerged so far, this figure includes earlier operations which had nothing to do with the IOR," he said.

Vatican officials have stoutly maintained in recent days that if the Holy See has made mistakes in the affair these have been due to oversight and inexperience, and are not the fault of the IOR.

This seems to amount to a rebuke for Archbishop Paul Marchisius, the IOR's president for the past 12 years. Relations between the secretary of state and the Chicago-born archbishop are said to be not good.

Last month the Vatican rejected on procedural grounds judicial communications sent by Milan magistrates probing the Ambrosiano case to Archbishop Marchisius and two other top-IOR executives.

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French 'threat' to requisition work on pipeline

By David White in Paris

THE FRENCH Government is understood to have threatened to requisition the services of Dresser-France, if it fails to fulfil its share of a contract to supply equipment for the gas pipeline to be built between Siberia and western Europe.

The heavy engineering company, a subsidiary of Dresser Industries of the U.S., is to send its firm compressor to the Soviet Union this week.

What was alleged to be a confidential telegram, containing the threat, was published in Paris newspapers at the weekend.

The French Foreign Ministry would neither confirm nor deny the existence of the cable, which had been sent to France's main embassies, but said that such measures would not be out of keeping with the government's position.

Dresser is believed to have three compressors ready for shipment to the Soviet Union under a deal headed by the Creusot-Loire group of France and the West German firm of Alstom-Atlantique, which has a FFR 400m (£33.53m) contract for 40 spare kits of rotor blades, dated before the first U.S. embargo, and Creusot-Loire, which, apart from compressor units, also has a contract for refrigeration stations.

Alstom has a licence agreement with General Electric of the U.S., which was initially to have supplied 125 rotor-blade kits for the project.

Creusot-Loire, meanwhile, has a licence link with Cooper Industries of the U.S.

Total French orders for the pipeline—including other companies, such as Thomson-CSF and Vallourec—are worth about \$700m (£492.3m).

Britain invoked its Protection of Trading Interests Act to circumvent the U.S. embargo and this disappointed the Reagan Administration.

The prohibition announced this month by Lord Cockfield, the British Trade Secretary, was designed to prevent compliance with the embargo by four British companies, which are contracted to supply £134m worth of goods for the pipeline.

The EEC has also argued that Washington is infringing international law through its embargo on the use of European U.S. technology by European companies making components for the pipeline.

Schmidt warning on trade, Back Page



M. Pierre Mauroy: Defying the U.S. embargo.

text said, if it were to continue to respect the orders of its U.S. management and refuse to execute the contract,

Another U.S. subsidiary, Rockwell-Valves, part of the Rockwell group, was also among the companies said to have been notified. The others were Alstom-Atlantique, which has a FFR 400m (£33.53m) contract for 40 spare kits of rotor blades, dated before the first U.S. embargo, and Creusot-Loire, which, apart from compressor units, also has a contract for refrigeration stations.

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IMF expansion warning after 'troublesome' year

By Reginald Dale, U.S. Editor in Washington

WORLD ECONOMIC development over the past year have remained troublesome in spite of signs of progress in the fight against inflation, the International Monetary Fund says in its annual report, published today.

Among the many major problems, the fund cites low or negative growth rates, inflation that is still too high in most countries, increasing unemployment, the extremely slow growth of world trade and volatile interest and exchange rates in the industrial countries.

The fund warns sternly of the dangers of protectionism and of governments shifting too soon to expansionary fiscal and monetary policies. It is worried by the way increasing social and political strains stemming from unemployment are creating pressure for a relaxation of restrictive, anti-inflationary financial policies.

It adds that the threat of protectionism is also increasing as a result of weak demand and high unemployment in the industrial countries. The problem requires "the utmost vigilance and prudence in government actions" if serious consequences for the growth of world trade are to be averted.

Weak demand in the industrial countries has also had a negative impact on prices of primary commodities and hence on the export earnings of many developing countries. Impairment of the international purchasing power of these countries, in turn, has contributed further to the slowdown in world trade.

Important problems in the industrial countries include "various rigidities and structural imbalances that have become embedded in the economic system," the fund says.

Examples are to be found in wage bargaining and price setting, government subsidies or protection of ailing industries, the imposition of governmental regulatory burdens and in structural unemployment.

Rigidity in government spending and taxation has resulted in large budget deficits. These have had adverse direct effects on prices and costs, hindered the effectiveness of monetary restraint and forced interest rates up.

The fund calls for comprehensive policies to control the growth of nominal demand and eliminate these rigidities, backed up in some cases by flexible or informal incomes policies.

The industrial countries are stalled in a long period of slow growth in output and demand, the report says. Their average real increase in gross national product was only about 1.25 per cent a year in 1980 and 1981, compared with 4 per cent and 3.2 per cent in 1977 and 1978—and 1982 is shaping up as another weak year.

The current account surplus of the oil exporting countries fell sharply from \$116bn (£68bn) in 1980 to \$69bn last year, while the industrial countries' deficit was reduced by \$40bn to about \$4bn, excluding official transfers.

The fund says that further substantial shifts in the same direction were in progress during the first half of 1982.

David Tonge writes: last year was a good one for the IMF's attempt to build up the credibility of its paper money, the Special Drawing Right. By the end of 1981 about SDR 5bn (£4.6bn) was on deposit in SDR-denominated accounts, SDR certificates of deposit were being traded with some SDR 700m issued, and SDR 2bn of SDR-denominated loans were outstanding, according to the IMF's annual report.

Development of the asset had been helped by the IMF's end of 1980 move restricting the SDR's currency basket to the D-mark, French franc, Japanese yen, pound sterling and U.S. dollar.

This year the continuing strength of the dollar has caused investors to lose considerable interest in the SDR, a point not covered by the IMF. However, the fund's report does provide calculations designed to show how over the long term the SDR serves to act as a hedge against currency fluctuations.

It calculates that between June 1973, before the first oil shock, and March this year a holding in SDRs—had they existed—would have appreciated by exactly the same amount as a holding in short-term U.S. treasury bonds. By contrast, investors in sterling and francs would have done better if they had chosen SDRs, while those of Japanese yen and D-marks would have done slightly worse.

Lamhard, Page 11 Lex, Back Page

Civil Service strike still hurting

By Max Wilkinson, Economics Correspondent

THE COST of the civil servants' strikes in 1981, which ended a year ago, is still more than £4m a week for the extra loans required to make up for uncollected taxes.

There are now fears in Whitehall that a substantial sum might have to be written off altogether.

According to the latest Treasury estimate, the extra interest payments resulting from the five-month dispute reached £550m by the end of June—the same as the cost of the Falklands conflict in this current year.

At the time of the last Budget it was estimated that between £1.25bn and £1.5bn of income tax value-added tax and national insurance contributions outstanding from the time of the dispute had still not been collected.

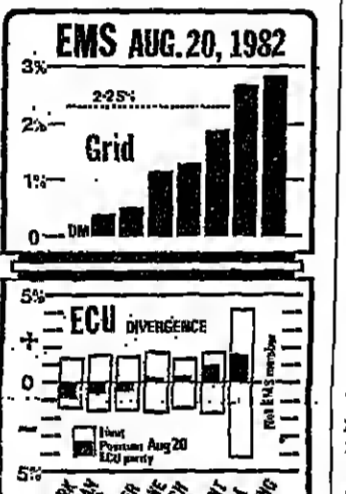
Although the Inland Revenue and the Customs and Excise Departments have said they expect eventually to collect most of the backlog, a substantial proportion remains unpaid.

There is a similar problem at the Customs and Excise Department, which collects value-added tax.

Both departments say that extra investigators would bring in more than the cost of their salaries by rooting out tax evasion. Each Inland Revenue investigator for example, produced last year an average of £92,000 in revenue which would not otherwise have been received.

The departments have gained the support of MPs on the Public Accounts Committee for their case for more staff, but the Government is not likely to give way. In addition to the overall constraint on Civil Service numbers, there is the general Conservative anxiety about employing too many "tax snooters."

Moreover, the Treasury argues that, although it is desirable to stamp out tax evasion through special investigators does not represent the creation of new wealth in the economy. It cannot be argued that extra inspectors would pay for themselves in an economic sense, the Treasury believes.



The chart shows the two constraints on European Monetary System exchange rates. The upper grid based on the weakest currency in the system defines the cross rates from which no currency (except the lira) may move more than 2 1/2 per cent. The lower chart gives each currency's divergence from the central rate against the European Currency Unit (ECU) (set at a basket of European currencies).

● CIVIL SERVANTS' strike last year is still costing £4m a week for extra borrowing required because some tax has not been collected. Back Page

● NATIONAL SAVINGS is falling well behind its target of a £2bn contribution to Treasury funding in 1982/83. Page 4

● LOW STOCK LEVELS could endanger a UK economic recovery by creating opportunities for importers, said the Fraser of Allander Institute. Page 4

● BRITISH STEEL is to lay off 5,500 of its Welsh tinplate mills, and Dunlop is laying off 3,000 for a week at its Port Dunlop tyre factory near Birmingham. Back Page

● HEALTH UNION Cohse will meet this week to discuss recalling its annual conference to endorse an escalation of the pay dispute. Page 5

● IBM's Greenock, Renfrewshire, plant might be chosen to build the company's new Personal Computer. Page 4

● BELL CANADA, telecommunications concern, said it would proceed with its re-organisation plans in spite of a call for a public inquiry. Page 14

● FOKKER, Dutch aerospace company, net profits edged forward to Fl 6m (£1.27m) from Fl 5.84m in the first half. Page 14

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OVERSEAS NEWS

Indefinite state of emergency in Peru

By Doreen Gillespie in Lima

PERU's civilian Government has declared an indefinite state of emergency in the provinces of Lima and Callao to give the police a free hand to wipe out terrorist activity.

The state of emergency allows police to search and arrest without warrant, ban public meetings and restrict travel within the country. Although Peru's constitution limits a state of emergency to 60 days, Dr Manuel Ulloa, the Prime Minister, said the measure would be renewed as many times as necessary.

The emergency follows the dynamiting of five electricity pylons in and around Lima which plunged the capital population into darkness last week. The authorities say all five towers were dynamited within a five minute period. Incendiary bombs and sticks of dynamite were tossed at a number of buildings at the same time and at least five shops were damaged by fire.

Damage is estimated at around £700,000 including losses caused by closure of factories and businesses. There were no reports of deaths or serious injuries apart from two people killed in traffic accidents during the blackout.

The attacks are blamed on a Maoist group known as Sendero Luminoso, the Shining Path, which has been opposing the Government headed by President Fernando Belaunde since it took office two years ago.

Action was at first limited to sabotage of pylons and bridges mostly in the southern Sierra region of Ayacucho, but has since expanded to include guerrilla warfare.

At least 10 people, including five policemen, have been killed in and around Ayacucho in the past six weeks.

President Belaunde is being pressed to call out the armed forces but claims that the terrorists can be dealt with by the police. The President has said that they have received financial help and advice from abroad but has not shown evidence.

U.S. sees that in the Mideast dogs do not sleep

BY ANATOLE KALETSKY IN WASHINGTON



Mr Shultz... 'great strains'

"PERHAPS this is the moment when people can turn their eyes from the problems of war to the problems of peace. . . . People must see now that the alternative to a relatively peaceful situation is not a pleasant thing to contemplate."

When Mr George Shultz, the U.S. Secretary of State, made this characteristic understatement last Friday, the "people" he referred to were not only citizens of Beirut, Palestinian refugees or Israeli soldiers.

The lessons which the American people draw from the Lebanon crisis may turn out to be as vital to the Middle East's future as the new realism which the Palestine Liberation Organisation's military defeat may be inducing in the Arab world.

More than ever, the U.S. is now established—in no small measure through Mr Philip Habib's personal efforts—as the dominant power in the region and as the only mediator capable of providing a common language for the Arabs and Israelis.

At the same time Americans, from the President downwards, have recently been reconsidering most of their assumptions about the Middle East and Israel. They have been detaching their hitherto unquestioning support for Israel, wondering about the vulnerability of a tiny Israel confronted by the hostile

Arab hordes, thinking for the first time about the fate of the Palestinians and talking about the historic hardships which they have faced.

On the whole—and again from the President downwards—the Americans have not swerved from their basic loyalty to Israel as a nation, though they have learned to distinguish between the State of Israel and the Government of Mr Menahem Begin.

What has changed sharply, however, is the complacency that followed the peace treaty between Israel and Egypt: the idea that "let sleeping dogs lie"

was an acceptable policy for the Middle East. The Lebanon crisis has shown that such a policy is not only unacceptable—it is impossible. In the Middle East dogs do not sleep. They may crouch silently, but they are always prepared to pounce.

The U.S. Government has made its continuing sympathy for Israel, despite what Mr Shultz called the "great strains" of the past few weeks, clear enough through its public statements and actions.

President Reagan's publicly-expressed "outrage" at the Beirut Government's military actions in the last days of the siege of Beirut, was a reminder of how hard the U.S. had to be pushed before it was willing openly to condemn its friends.

The public's basic sympathies also seem to be unchanged, to judge from recent opinion polls. In the latest, published on Friday in the Washington Post, the answers to the question: "Do you sympathise more with Israel or with the Arabs?" split 52-18 in Israel's favour. It may seem astonishing to Europe, but this attitude has been essentially unchanged throughout the war in Lebanon. In March, three months before Israel's invasion, the split in favour of Israel in response to the same question was 53-18.

The same polls suggest that the American public's loathing of the PLO—the President himself still habitually refers to them as "the terrorists"—has, if anything, grown. Nevertheless, there has been a historic change in perceptions about the Middle East, in the words of one State Department official. The President now realises that the region will be fraught with dangers even after the PLO's evacuation. After each crisis there will be further crises. As long as there is no

Marines under strict orders

AMERICAN SENSITIVITY over the use of U.S. troops ashore is such that the 800 Marines, due to land in Beirut later this week will be under the strictest orders not to get into trouble, Reginald Dale writes from Washington.

The Marines, from the 32nd amphibious unit, have been strictly instructed not to engage in combat, although they may "exercise the right of self-defence." If there is any armed violation of the evacuation agreement, they will withdraw immediately.

The Pentagon says that an isolated shot at the Marines "by a simple, deranged person" would not lead to a withdrawal, but anything much more serious would.

Enlisted men will come ashore with M-16 rifles, officers will carry 45 calibre pistols, helicopter pilots, 38 calibre pistols. They may be supplied later with machine guns and mortars, but they will leave their artillery and tanks on support ships off shore.

They may use their weapons individually in self-defence if fired on by any other forces, including the Israelis. They are not meant to have direct contact with Palestinian forces, the Pentagon says, and will not work on defusing mines and booby traps.

framework for stable relationships between Israel and other Arab countries, like the one which President Jimmy Carter helped fashion between Israel and Egypt at Camp David, the Middle East will remain a running sore. And the Reagan Administration will now be held responsible by domestic as well as international opinion for doing something to heal it.

Although Mr Shultz admits freely that his policies on the Middle East have yet to be

back-burner because of both the deterioration in the fighting in Lebanon and evident U.S. reservations.

The Franco-Egyptian initiative was based on mutual and simultaneous recognition of all the parties involved. It affirmed both Israel's right to exist within secure frontiers and the Palestinians' "national" right to self-determination. The Egyptians were understood to have won backing from several Arab countries for the draft resolution.

President Mitterrand made clear in his television interview last week that France was sticking to its previous policy on the PLO, and would recognise it only if it adopted a negotiating position based on recognition of Israel.

France and Egypt try to revive UN initiative

BY DAVID WHITE IN PARIS

TALKS are planned here today between Claude Chysson, the French External Affairs Minister, and his Egyptian counterpart, M Boutros Ghali, on a possible revival of joint initiatives in the United Nations aimed at forming the basis of a political settlement in the Middle East.

The Egyptian Foreign Minister arrived in Paris from Washington yesterday. Although a meeting has not been officially announced, M Chysson is known to be anxious to seize the opportunity of renewing joint efforts as soon as possible following the evacuation of Palestinian forces from Beirut.

A draft resolution submitted by France and Egypt late last month put on the

Moi moves to strengthen security forces

By Quentin Peel, Africa Editor

PRESIDENT Daniel arap Moi of Kenya announced two drastic steps at the weekend to reorganise the country's security forces in the wake of the abortive August 1 military coup, which was at the heart of the rebellion, and the sacking of the police chief, Commissioner Ben Gethi.

The announcement, on Voice of Kenya radio, said the 2,100-man air force would be reorganised under the command of Major-General Mahamoud Mohamed, hitherto the deputy Army Commander, and the man credited with the crushing of the coup attempt.

The radio said that Commissioner Gethi had been "retired in the public interest" with immediate effect, and replaced by the head of presidential security, Deputy Commissioner Bernard Njiliu. Mr Gethi was also replaced as head of the paramilitary general service unit which helped to put down the coup attempt.

The sweeping action in disbanding the Air Force, which is one of the best trained and equipped in Africa, with 29 combat aircraft, including 10 U.S.-built F5 jet fighters, was effectively forced on President Moi, because fewer than 500 men have escaped detention.

The sacking of Mr Gethi is much harder to explain, for he has always been regarded as a close ally of Mr Charles Njonjo, the former Attorney-General, now Minister of Constitutional Affairs, who is arguably the most powerful man in the Kenyan Government after the President.

There had not been any public questioning of the loyalty of the police during the coup attempt, which was crushed in seven hours, although it is now officially said to have cost 150 lives (unofficial estimates are much higher) and caused damage valued at more than \$100m (£58m).

The new air force commander, General Mohamed, is from the northern Somali minority group.

Reuter adds from Harare: The Zimbabwe Government yesterday showed journalists the bodies of three white men who it says are South African soldiers killed in a clash with the Zimbabwe army last week. Mr Robert Mugabe, the Prime Minister, said the men were part of a group that had set up a base inside the country.

Emotional departure for PLO

BY STEWART DALBY AND NORA BOUSTANY IN BEIRUT

THE EVACUATION of fighters of the Palestine Liberation Organisation (PLO) at first moved ahead slowly yesterday. Between 500 and 1,000 troops, mainly from Fatah, the mainstream guerrilla organisation headed by Mr Yasser Arafat, the overall PLO leader, assembled in a sports stadium in West Beirut and were driven down to the largely-destroyed port area of the capital.

There a corps of about 350 French paratroopers, the vanguard of the projected 1,600 to 2,000 multinational force, and the Lebanese army checked them on to a Greek freighter which was to take them to Larnaca in Cyprus and then on to Tunis, or direct to Tunis.

The first departures of some 400 pro-Israel Arab Liberation Front fighters on Saturday, took place against a background of great emotion.

As the fighters assembled on

dark green Lebanese army trucks, to the accompaniment of revolutionary songs, wives, girlfriends and children cried, shouted, screamed, and spat, cursing Arab regimes.

One little blonde girl, who burst into tears, asked why she was crying, said: "Now I will have to wait to go to Palestine. I hope Yasser Arafat lives long enough."

Some 12,000 Palestinian fighters are due to be evacuated over the next two weeks. This comprises 7,500 PLO fighters and leaders, including Fatah; Salaf, the pro-Syrian faction; the Arab Liberation Front; the pro-Iraqi equivalent; and the various PLO brigades from Arab countries.

There are also between 1,500 and 2,500 Syrian army regulars who were cut off in West Beirut in the early days of the Israeli siege of the area in June.

If all goes according to plan, between 500 and 1,000 fighters

will leave each day. Some will continue leaving by boat either from Beirut itself or Jounieh, in the Christian enclave to the north, while others will go by road to Damascus. Ultimately, they will end up in elsh Ara countries: North and South Yemen, Sudan, Syria, Jordan, Iraq, Tunisia and Algeria.

But the fragility of the operation was shown up yesterday when Israel halted the evacuation after the Palestinians reportedly tried to leave with military vehicles. They were allowed to take only their small arms with them. This includes weapons up to their Russian-made AK-47 automatic rifles.

This has meant that although the tension has tangibly drained from the shattered city, Beirut is hardly quiet. All day yesterday, there was a cacophony of arms fire as PLO guerrillas fired their guns, and occasionally let off rockets and mortars into the air for no apparent reason



Mr Arafat... troops depart

except to protest at the occasion. Along the port area and the sea front, once one of the most elegant esplanades in the world, men and boys fired their guns aimlessly into the sea. But neither the Israelis nor the French paratroopers seemed bothered by these gestures.

Meanwhile, the postponed elections for a new Lebanese president may take place today.

IMF ANNUAL REPORT

Industrial economies make progress against inflation

BY MAX WILKINSON

A WORLD economy dominated by the industrial countries' continued fight against inflation, stagnant output and resulting difficulties in many less developed countries, is described in the International Monetary Fund's annual report out yesterday.

The fund says there is evidence that considerable progress has been made in reducing inflation in the industrial countries last year and in the first half of this year.

It believes, however, that the recent deceleration of consumer price rises has stemmed in part from transitory influences, including the decline in oil prices and the weakness of basic commodity prices as a result of the worldwide fall in demand.

The report says: "Increases in basic costs (mainly wages) have not come down nearly so much during the past year as final product prices, and continued progress in reducing them will require both maintenance of restraint in financial policies and public conviction that such policies will not be reversed."

In spite of exceptionally high and rising unemployment in most countries, the fund says national authorities have repeatedly expressed the conviction that further progress in reducing and controlling inflation is the prerequisite for any lasting improvement in employment.

It also warns that the structural rigidities, including labour market restrictions and

tax and benefit systems, may be resulting in an underlying upward trend in unemployment. Even after the ending of the present recession, the world might not return to previous levels of employment without a fundamental effort to reduce these rigidities. Redistributive fiscal policies would not, on their own, be effective.

Moreover, the Fund says that in most countries the fiscal stimulus to the economy has not been reduced much since actual government deficits have been raised. This emitted from a fall-off in revenues while disbursements for social security and other programmes have tended to stay constant, or to rise.

The report also discusses different aspects of the world economy and its difficulties in more detail:

● Inflation The inflation rate in the industrialised countries, as measured by the change in prices from one quarter to the next, fell to about 5 per cent at an annualised rate in the first three months of 1982. This is well below the prevailing rate in 1981, just before the effect of the second oil price increase. After the 1979 oil shock, the average annual inflation rate in the major countries reached a peak of 14 per cent, but decelerated after oil prices tapered off to between 9 and 10 per cent in the latter part of 1980.

In most of 1981, however, deceleration of the inflation

Warning on interest rates

THE FUND warns that there is no easy way to reconcile the need for credible policies to reduce money growth with the need for stable interest rates. Max Wilkinson writes.

If the authorities stick to a target for the expansion of money supply, changes in financial practices and in demand for money can lead to wide fluctuations of interest rates.

However, the IMF believes this should not undermine the determination to stick to sound monetary policies.

rate was limited and irregular. The further slowing down of inflation at the beginning of this year reflected the retape of the U.S. economy into recession, the decline in oil prices, the marked weakening of commodity prices and an easing of wage demands in several countries.

● MONEY SUPPLY A weighted average of indices of narrowly defined money in the seven major countries shows that annual rates of expansion have been reduced from 10 per cent in the period 1976-78 to 7½ per cent in 1979 and to about 6½ per cent in both 1980 and 1981.

The broadly defined money supply grew at the rate of 11 to 13 per cent a year during 1976-

1978 and by about 10 per cent a year in the past three years.

● Output The fund says: "At mid-1982 the economies of the industrial countries were stalled in a prolonged period of slow growth. Aggregate growth of real GNP in these countries averaged only about 1½ per cent a year in 1980 and 1981 compared with 4 per cent from 1977 through 1979; and 1982 is shaping up as another year of weak expansion on an annual basis."

It believes, however, there may now be an improvement in real disposable incomes and therefore of consumer demand. After a decline during 1980, real wages have now begun to rise as a result of the faster deceleration of price inflation

compared with the rise in nominal wages. The Fund says that the stagnation of economic growth has reflected the anti-inflation policies of the major powers as well as the "corrosive effect" of inflation itself on real incomes and expenditures along with the deflationary effects of the oil price rises in 1979-80.

These negative influences were softened to some extent by the increased demand from the oil-exporting countries. This helped real exports from the industrialised countries to rise at rates of 8 per cent in 1980 and 4½ per cent in 1981.

● INVESTMENT AND STOCKS Weak consumer spending, the erosion of profitability and the higher cost of capital have all contributed to depress rates of capital spending.

In real terms, gross fixed investment in the industrial countries rose by 4 to 5 per cent a year in 1978 and 1979, but it declined by 1½ per cent in 1980 and by another ½ per cent last year. Nevertheless, the Fund says the weakening of capital investment was less severe than after the first oil shock in 1973.

Depressed profits, the relatively high cost of labour and rigidities in labour markets have, nevertheless, shifted the focus of capital spending towards labour-saving rather than to capacity-expanding investments.

● UNEMPLOYMENT By mid-1982 unemployment

bad risen to about 8 per cent of the combined labour force of the industrialised countries, compared with 5 per cent in 1979. In all the major countries the approach, or substantially exceeded, those in the 1973 recession. In the industrial countries this increase in unemployment occurred despite a slowing in the growth of the labour force.

The fund says that although the current increase in unemployment is cyclical, there are severe implications.

"First, there is an absence of any prospect of an early reversal, given the outlook for only modest recovery from the present recession."

Second, the recent cyclical increase has been superimposed on a secular increase of more fundamental character.

Even before 1980, unemployment had been rising steadily for about 12 years (except in Japan) from about 3 per cent of the labour force in 1966 to 4 per cent in 1973 and 6 per cent in 1979. Recently the effects have been particularly severe for immigrants, minority groups and young workers. Average youth unemployment in Europe and North America reached 18 per cent early this year.

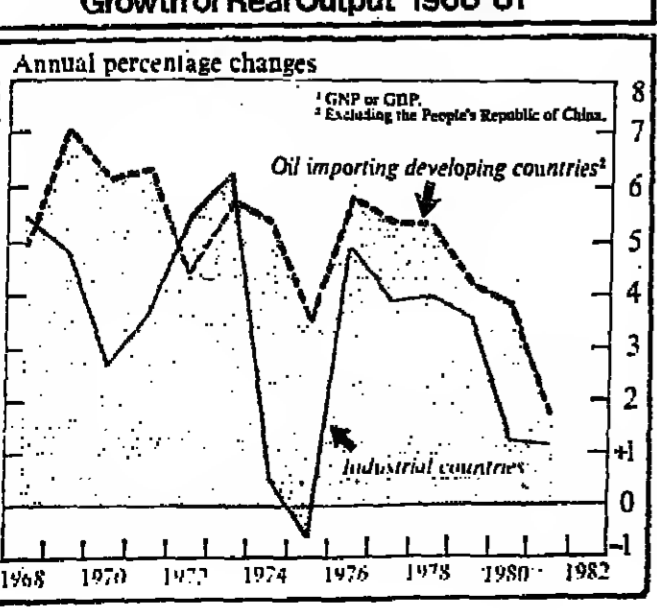
International Monetary Fund Annual Report of the Executive Board for the financial year ended April 30, 1982. Washington DC 20431 U.S.

THE FUND says the main feature of the global pattern of payments balances in 1981 was a partial reversal of the shifts which occurred in the preceding two years.

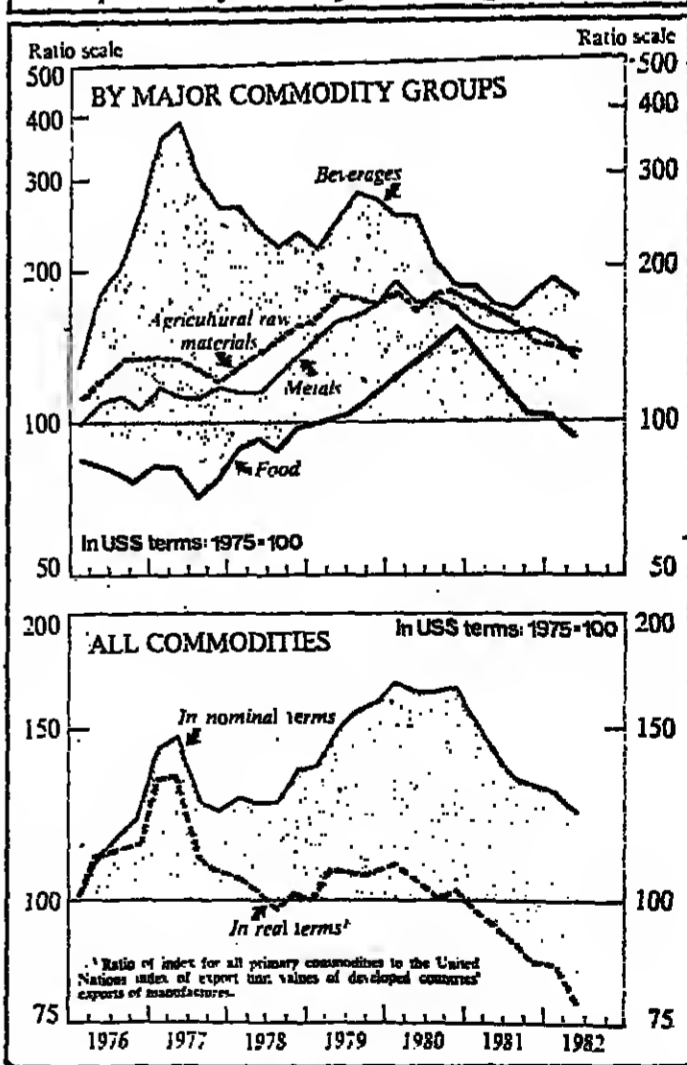
The current account surplus of the global pattern of payments balances had had few or no conditions attached. The fund's report refers to the problems faced by an increasing number of developing countries in meeting these conditions.

The fund has long been criticised by developing countries for its "conditionality," but its report writes of the advantages obtained by countries which have adopted IMF programmes: "Developing countries with Fund-supported programmes generally achieve a significant improvement in their balance of payments, both in absolute terms and in comparison with all non-oil developing countries. Second, the rate of inflation grows less in countries with Fund programmes than in non-oil developing countries as a whole."

Selected Groups of Countries: Growth of Real Output 1968-81



Indices of Prices of Non-Oil Primary Commodities Exported by Primary Producing Countries



countries. However, the domestic policies of the major oil exporters have tended to be less expansionary than after the oil price increase of 1973.

Although imports of these countries rose in volume by 20 per cent in 1981 compared with 15 per cent in 1980, a moderate increase of perhaps 5 per cent is expected this year. The role of import expansion in curtailing the current account surpluses of oil exporters has been less than it was after 1973-74. The major factor in recent years has been the net deficit on services and transfers.

The developing countries without oil have been in a much worse position. Their exports of commodities have been badly hit by weak demand and falling prices

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Another U.S.-Brazil trade dispute looms

BY ANDREW WHITLEY

ANOTHER BRUISING trade dispute between the U.S. and Brazil is looming over charges that the Brazilian government has unfairly aided the development and export of the country's most successful civilian aircraft, the Embraer Bandeirante.

Textiles, shoes, sugar and steel products are all on the current list of headaches between the two countries. With the exception of steel, where the U.S. has dropped five out of six specific complaints, all the other disputes are virtually deadlocked.

Fairchild Industries, the struggling U.S. aircraft manufacturer, has formally asked the U.S. government to impose countervailing duties on the Bandeirante, an 18-seat commuter aircraft. These duties could add up to 44 per cent to its sales price in the U.S., according to Fairchild estimates.

The petition is now with the U.S. Department of Commerce and the International Trade Commission which will determine whether there is a case to answer. The ITC has 45 days to come up with its findings following the lodging of the Fairchild petition on August 13.

Fairchild makes clear that it regards its complaint against the Brazilian manufacturer as a test case. Government officials believe the outcome could encourage the major U.S. manufacturers, Boeing or Macdonald Douglas, to take similar action against their main foreign competitor, Europe's Airbus Industrie.

The petition from Fairchild Swearingen, a subsidiary of

Fairchild Industries, is that Embraer, which is a Brazilian Government controlled company, receives numerous subsidies on the development, manufacture and export of the Bandeirante. This is a complaint which could be alleged against any of many similar manufacturers in developing countries, seeking to challenge Western companies in their fields.

Fairchild Swearingen also says that Embraer has recently been offering its U.S. customers interest rates less than half of those required for the purchase of its own Metro aircraft. As a result, Fairchild's claims Embraer's share of the commuter aircraft market has grown to almost 35 per cent in its launch in the U.S. two years ago, and that its own position suffered proportionately.

Paul Cheeseright reports on a UK company in a new series of occasional articles about consultants at work Facing up to a tougher future

BRITISH CONSULTANTS have had a good run, but they are facing a difficult decade, according to Mr Des Sainsbury, a director at W.S. Atkins, one of the biggest of the UK consulting groups.

Invisible earnings from consulting engineers have risen steadily to £487m last year from £401m in 1979. This year, according to the Association of Consulting Engineers, new work is keeping ahead of work finishing off and there could be a 12 per cent rise in earnings.

The immediate problem for the consultants, the Committee on Invisible Exports noted, is that margins are still under great pressure from rising salaries and local expenses.

Against this, there has been some reduction in interest rates and inflation which, noted Atkins, was coupled with a fall in the value of sterling and has improved competitiveness. The group's pretax profits in the year to last March rose sharply to £1.6m from £794,000 the year before.

But in the longer run, there

is increasing competition to be faced from engineering consultants of all nationalities. Mr Sainsbury observed that Atkins is competing more with consultants from, for example, Brazil, India, the Philippines, and the East bloc.

The solution, he suggested, is to move to higher value work in high technology areas and in top level management.

The way in which this works in practice was evident at the developing steel complex at Misurata in Libya. Dastur of India won the general consultancy contract early on, but now that the Libyan authorities are committed to heavy spending in a sector of which they have no first hand experience, Atkins has been called in.

The contract it has won provides for technical and project management assistance. Personnel from the group have been welded into the management team to help control of the project and monitor the cost and quality of the contractors' work.

Atkins' involvement in Libya

is no accident. It has been cultivating the North African markets for 20 years. Indeed, last year it completed what is believed to be the most valuable consulting contract ever granted to an independent group.

Since 1969 it had been working on the El Hadjar steelworks expansion project for Société Nationale de Sidérurgie of Algeria — a contract which lasted so long, it took 3m man-hours of work by Atkins' specialists.

The Algerian contract was partly instrumental in encouraging Atkins to develop the North African markets, but the group's activities are worldwide. It had a 1981-82 turnover of £46.9m, of which 43 per cent came from overseas.

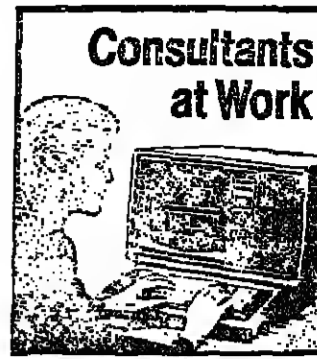
At any one time, both at home and abroad, the group can be working on more than 250 contracts. Each has a project manager, responsible to a project director and a senior director who would be responsible for operations in a distinct geographical area.

The project manager pulls together from within the group the resources needed for a particular task. Atkins, from its base in Epsom, Surrey, has a total of 2,000 personnel split into divisions corresponding to particular disciplines and sectoral activities.

Atkins is best known for its work in the steel industry. Mr Sainsbury noted, and it tends to have knowledge of the projects being considered around the world and when they will come up.

In the case of the Misurata steel complex, Atkins knew five years ago that the Libyan Government was planning a development, so it maintained contact.

On capital projects like Misurata, total consultancy costs to the buyer could amount to between 2 per cent and 7 per cent of the total outgoings. The consultancy work will go through several phases, starting with basic feasibility studies, through project development to project management.



Atkins is often in competition with plant contractors for feasibility studies, which Mr Sainsbury said, might be offered free, although their price would be wrapped up in the possibility of plant sales. "The original conceptual work needs to be done by a consultant independently. It sets the project in the market place."

Contractors have a basic interest in making and selling equipment; their minds are not geared conceptually, according to Mr Sainsbury. "All contractors' efforts are on the physical side—they don't think in terms of the market or the product mix."

For a consultant, the question is how to establish what a client needs and how the need can be met. "If you have 100 people on an air route, you don't need a jumbo jet."

EEC reaches deal with Turkey on cotton yarn exports

BY GILES MERRITT IN BRUSSELS

EEC-TURKISH relations are expected to improve discernibly as a result of the new bi-lateral arrangement reached between Brussels and Ankara on Turkey's cotton yarn exports, and a mutual agreement to drop restrictive measures that had stemmed from their cotton row.

The European Commission has now negotiated a special export restraint deal with Turkey that will for this year limit Turkish cotton yarn sales in the EEC to an overall figure

Japan steel mills deny dumping charges

THREE MAJOR Japanese steel mills have denied a dumping charge by the U.S. Commerce Department. Sumitomo Metal Industries, Nippon Kokan K.K. and Sanyo Special Steel, were commenting on the reported preliminary ruling that heat-resisting and stainless pipes and tubes from the Japanese mills were sold in the U.S. below their fair market value.

The preliminary ruling is the result of the Commerce Department's investigation of a dumping complaint by Babcock and Wilcox Company of Beaver Falls, Pennsylvania. The Department said the dumping margins ranged from 0.62 per cent to 10.14 per cent of the product's value.

Dumping occurs when steel is sold at a price below that charged in the exporters' home market or below the manufacturers' costs of production.

As a result of the preliminary ruling last week importers of such tubular products from the three Japanese mills will be required to post bond equal to the dumping margin—effectively raising the price of the products to fair value.

U.S. officials said more than 24,000 net tons of the pipe and tube products worth about \$85m were shipped into the U.S. last year. But they were unable to say how much of that steel was covered by the ruling.

A final ruling is due by November 1. If today's findings are upheld, the bonding requirements could be received by permanent penalty duties. Agencies

SHIPPING REPORT Hopes for market balance

BY ANDREW FISHER, SHIPPING CORRESPONDENT

WITH A record amount of laid-up vessels, some 13½m dwt tanker tonnage—some 55m deadweight tonnes—laid up because business is so slack, the market could return to balance earlier than expected.

Such hopes, however, have no immediate impact on the currently depressed rate structure in the charter market, commented E.A. Gibson Shipbrokers in its weekly review.

But a number of factors are combining to reduce the large tanker surplus. As well as the

laid-up vessels, some 13½m dwt are used for storage and an unspecified number simply trading uneconomically.

Already this year, 15m dwt have been scrapped—more than the figure for all of 1981—and the new building programme is very tight.

Thus, it adds, "the equilibrium for modern efficient units acceptable for today's trading should be reached earlier than perhaps previously envisaged."

Motorola urges action on Japanese bleepers

BY LOUIS KEHOE IN SAN FRANCISCO

MOTOROLA Inc. of Schaumburg Illinois has filed a petition with the U.S. Commerce Department and the International Trade Commission asking for anti-dumping action against a Japanese manufacturer of pagers—the bleeping message devices. According to Motorola, Japanese entry into the \$400m (£235m) U.S. market, for pagers in late 1981, caused a precipitous price drop.

Motorola says that in October 1981, Matsushita introduced a pager device in the U.S. selling here for \$79 to \$90. An equivalent Matsushita pager was priced at \$215 in Japan at that time. Motorola contends. The Matsushita devices were immediately successful in the U.S. market. Motorola says that Matsushita took orders for 25 to 30,000 units in October 1981.

Thyssen wins £101m project in Saudi

A UNIT of the diversified Thyssen steel group has received a DM 435m (£101m) order to erect a big commercial centre at the Saudi Arabian port city of Jeddah.

The order went to Thyssen Saudia, a subsidiary of Thyssen Rheinisch Technik GMBH, the engineering company in the Thyssen group that supervises execution of the project. AP-DJ

World Economic Indicators

FOREIGN EXCHANGE RESERVES (U.S.\$m)				
	June '82	May '82	Apr. '82	June '81
UK	10,574	11,134	11,644	14,837
Belgium	2,262	2,183	2,203	4,886
Italy	12,859	11,482	11,420	15,870
Netherlands	7,146	7,463	7,559	7,616
West Germany	37,408	38,045	37,624	44,618
Japan	21,702	22,801	23,102	24,245
U.S.	9,900	9,150	10,751	10,751
France	May '82	Apr. '82	Mar. '82	May '81
	13,669	15,260	17,439	27,201

Source: IMF.

INSURANCE

Problems of brokers' in-house schemes

BY JOHN MOORE, CITY CORRESPONDENT

THE REVELATION last week by Alexander & Alexander Services Inc, the U.S. insurance broker, that insurance company subsidiaries within its new UK acquisition Alexander Howden Group are under-reserved, highlights the problems which can arise if brokers attempt to operate in-house insurance company activities.

Insurance brokers buy insurance on behalf of clients from insurance companies. They are expected by the clients, who range from individuals to multinational companies, to place clients' business in secure markets at competitive premium rates.

The brokers are not remunerated by their clients but are paid commissions by the insurance companies or other insurance interests, such as Lloyd's of London underwriting syndicates, into which they place their business.

Insurance companies earn their money by attempting to make sure that the premium flowing to their groups are not exceeded by the insurance claims they have to pay out.

In an era of historically high interest rates, many insurance companies are prepared to take an underlying underwriting loss on their business to serve market share by offering competitive insurance rates. The money which they earn on invested premiums usually enables them to show an overall profit.

In the UK insurance brokers have in recent years been keen to develop their own in-house insurance company operations. In doing so the brokers hope to enhance the amount of revenue which can be generated by any one big ticket account, such as the insurances of a major industrial company, or secure smaller lines of insurance business for their own group which look like being extremely profitable (that is, where insurance claims are not likely to exceed premiums).

Some brokers in the UK have created a number of insurance company underwriting facilities in addition to their management of Lloyd's of London underwriting syndicates. In their integrated organisations, brokers arranging insurance cover may choose to start their insurance programme with their syndicates at Lloyd's of London. Usually, however, they prefer to become more closely associated with the more remote reinsurance programmes of

their Lloyd's underwriting syndicates or lines of other reinsurance business.

As a broker places a piece of business he takes a commission. If he arranges a complex reinsurance programme on a big account he will be using many companies offering reinsurance. In placing the risk he could be taking a commission many times over on any one piece of business.

If the broker is arranging the reinsurance programme with his own insurance companies, he will, in effect, be converting risk-bearing insurance premiums into non-risk bearing insurance broking commissions for his own group.

This way he gets the best of all possible worlds: The subsidiary companies are always likely to appoint the parent broker as the placing broker on major reinsurance accounts rather than other independent brokers. The subsidiary insurance companies should receive profitable business.

This form of premium stripping only works when insurance business is likely to be profitable. Things can go wrong. A freak series of very large claims—for example, on computer leasing insurance business or asbestos—will mean that reserves of the brokers' in-house insurance company subsidiaries may not be sufficient to meet claims.

This is because, as the insurance business has been threaded in and out of in-house companies and back again, so the cost of commission payment paid out of premiums to the brokers, will have risen dramatically.

The acquisition moves by U.S. brokers in the late 1970s were prompted by the realisation that UK brokers, with large Lloyd's of London insurance company interests, were making huge amounts of money on these forms of captive commission arrangements.

The U.S. brokers were producing enormous amounts of reinsurance and other business for Lloyd's in the mid-1970s because insurers in the U.S. had to lay off risks after falling stock market values had eroded their reserves.

Now, while U.S. brokers have gained a larger share of the world commission cake through their acquisitions of UK brokers, they are finding that strict financial controls are needed if broking and underwriting are to be successfully reconciled.

India rejects attack on trade regime liberalisation

By K. K. Sharma in New Delhi

THE INDIAN Government has rejected complaints by domestic companies that foreign concerns are taking advantage of its liberal trade policy to dump their products in the country.

The complaints relate mainly to imports of soda ash and polyester and viscose fibres, the prices of which have fallen sharply following a glut. The government has rejected complaints that free imports of such raw materials has adversely affected domestic interests.

One reason for the rejection was that the imports were welcomed by user industries which claimed that domestic producers had raised prices to show that cheap imports were affecting sales and capacity utilisation.

Taiwan eases curbs on Japan

TAIPEI—Taiwan has lifted restrictions on 842 Japanese consumer and fishery products, economic officials confirmed yesterday.

The economic ministry announced late on Saturday that Taiwan would resume imports of the 842 Japanese items as a first step to honour its commitment to phase out restrictions it had earlier placed on 1,500 Japanese products. AP

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UK NEWS

National Voters with the Calvinist view

Savings fall behind target

NATIONAL SAVINGS are falling well behind the £2bn target set by the Treasury as its contribution to overall funding for 1982-83.

Net National Savings receipts for July fell £15m on the month to £128.7m, bringing total net contributions by National Savings for the first four months of the current financial year to £504.3m—barely half the required amount of £1bn at this stage of the year.

However, moves announced by the Treasury on July 22 to boost the attractiveness of National Savings to the investing public came too late to have much influence on July's figures.

The first move, which doubled the maximum holding in index-linked National Savings Certificates (still known as Granny Bonds) even though they are now available to all investors) from £5,000 to £10,000 applied from Monday, July 26, was only effective for one week in July.

The other move, the launch of a National Savings income bond, took effect on Monday, August 2.

The Department of National Savings reports that both these offers have resulted in a substantial boost for savings. Despite strong Press criticism over the penalties for early cash-in income bonds worth £5.7m were sold in the first week and bonds worth £14.5m the second week.

Granny Bonds worth £25m were sold in the final week of July compared with an average weekly sale up to the £15m.

Even so, total granny bond sales in July at £98.5m failed to reach £100m for the first time in many months, being £8m lower than in June.

The department however reports a strong recovery of Granny Bond sales in August.

BY JOHN HUNT

RESEARCHERS at Conservative Central Office are claiming that a study which they commissioned indicates that the high level of unemployment is unlikely to lose the Tory party a large number of votes at the next general election.

The survey showed that uncommitted voters do not blame the situation on any one party and believe it has developed under successive governments.

The research was, however, of a tentative nature, it is a qualitative programme carried out by B.M. Research in which eight groups of 12 people were questioned in Liverpool, the Midlands and the South-East. They represented a cross-section

of socio-economic groups, all without party affiliation, and were invited in off the street.

Such research is now likely to be followed up by quantitative research amongst 2,000 people across the country.

The results are published in Conservative Newswire, a new monthly newsletter which, says Central Office, is intended to enthuse party workers.

Party officials speak of the need to keep members informed and involved over the next 12 to 18 months—indicating that they anticipate the election next autumn.

According to Newswire the responses show that the public expects Opposition politicians

and trade union leaders to accept their share of responsibility for unemployment.

'Labour and SDP claims about their ability to solve the problem were not believed by the voters,' it states. 'And the voters did not share the critics' views that unemployment was all the fault of the Government.'

The Government was not seen as free of responsibility, but the steps it had taken to root out poor working practices, over-manning and uncompetitiveness were seen as necessary.

The groups saw about 3m unemployed at the next general election but wanted to see the trend levelling out or dropping. Many of the groups emphasised their appreciation of strong political leadership, which was interpreted by Central Office as a plus factor for Mrs Thatcher. Researchers were also surprised to find that the groups took an 'almost Calvinistic view' of the need for personal responsibility, achievement and effort.

Prospectus for biotech must await appointment

By David Fishlock, Science Editor

THE BRITISH Technology Group (BTG) will appoint senior business management and a chief executive before it issues a prospectus for its proposed £15m biotechnology venture.

The venture, to be based on research by the Agricultural Research Council, will try to exploit genetic engineering techniques for the agricultural industry, such as Celltech—the first genetic engineering company backed by BTG—is developing new technology for the drug industry.

The potential for genetic engineering in agriculture ranges from giving plants resistance to diseases, pests and the weather, to increasing the yield and uniformity of a crop.

But no company prospectus has been issued yet, and no final decision taken on the capital required to launch the new company, while the appointment of a new chief executive is awaited.

A spokesman for BTG denied that Ultramar, the UK cell company had put money into the venture, but said it was 'a potential investor'. BTG was also seeking institutional investors. It wanted to commit as little of its own money to the venture 'as it can get away with', the spokesman said. BTG sees its main role as midwife to the new company, which it hopes will be born before the end of the year.

One formula being discussed with potential investors is for total launch capital of £15m spread over five years. The figure is based on the £12m with which Celltech was launched in 1980, increased according to inflation. The BTG investment in Celltech was £5m.

No name has been registered for the venture, but BTG staff refer to it as 'Agrigen' or 'Celltech's country cousin'. They stress, however, that it will not be a carbon copy of Celltech—drawing only on those parts of the Celltech blueprint which are appropriate.

One difficulty voiced by some potential investors concerns the role of the Agricultural Research Council (ARC) and its ability to deliver the results of basic scientific research with the facility which the Medical Research Council (MRC) guaranteed to Celltech. For example, the MRC had transferred all its information on monoclonal antibodies to Celltech in little more than a year.

The research institutes of the ARC have a strong tradition of independence from the London headquarters of the council.

Bribes reaction

BRITISH LEYLAND and Ford are ready to investigate any specific allegations that staff have been bribed over the placing of multi-million pound contracts.

The company said it did not have the full details of allegations made in yesterday's News of the World that staff were bribed, but said if any specific allegations were made they would be investigated.

Detective Chief Superintendent Colin Powell, the head of West Midlands CID, said 'The West Midlands police are not as yet in possession of any detail of these allegations.'

Telephone advice

BRITISH TELECOM customers with the telephone service from Britain to Antwerp, Belgium, The Belgian telephone authority has changed the dialing code for Antwerp from 31 to 3 Numbers in Antwerp have also been changed by the addition of a further prefixed figure. Customers needing help are advised to contact the international operator.

Hadfields capacity

IN June, 1981, Hadfields, the Sheffield engineering steel maker, cut its 350,000 tonne per year capacity by two thirds and made 1,800 of its 2,600 workforce redundant. A table in Saturday's editions of the FT stated erroneously that the company had closed down completely its engineering steel production.

Kodak introduces four instant cameras today

BY ELAINE WILLIAMS

EASTMAN Kodak is to intensify its attack on the instant camera market with the introduction today of a new range of cameras. It is trying to challenge Polaroid's domination of the market when global sales of instant cameras are static.

The global annual market for instant cameras is about 10m units. Polaroid holds 60 to 70 per cent of the U.S. market. It introduced new models this year to stimulate sales. Kodak says that its new Kodamatic cameras are slimmer and cheaper than previous designs.

Much of the profit in instant cameras comes from film sales, rather than the cameras themselves. There being only two big manufacturers in the sector, business for each is sufficient for continued investment in development of instant cameras. Kodak's new range is split into four models, which cost from £20 to £75. Each incorporates sophisticated electronic circuitry and built-in flash. The cameras will be manufactured in the U.S. and West Germany.

Greenock may make Personal Computers

BY JASON CRISP

SPECULATION IS growing in Scotland that IBM will manufacture personal computers for the European market at its plant in Greenock.

Although IBM is refusing to comment it is known that Greenock is one of the leading contenders for the project in competition with plants in other European countries.

The IBM Personal Computer was launched in the U.S. last August and has been selling in comparable numbers to the established market leaders Apple and Tandy. It has been so successful that IBM has had problems meeting demand.

The IBM Personal Computers have been sold in Europe, in very limited quantities, by some companies who have bought them from U.S. retail outlets to resell in the UK and elsewhere. IBM has not yet announced when the Personal Computer will be available in Europe. Greenock is a high volume production plant and

would be suitable for making the Personal Computer.

Other factors in the decision will include the balance of workloads at IBM's European plants, costing and the number of employees. Greenock's good levels of productivity are in its favour. Possibly against it is that it employs nearly 2,500 people. This is about the company's maximum limit for one location.

ICL, Britain's largest computer manufacturer, looks strongly placed to win a £50m contract to supply computer terminals for the Inland Revenue.

In 1980 ICL was awarded a major contract to supply powerful mainframe computers for the computerisation of the PAYE system.

The decision caused a major row as other manufacturers were not invited to tender. IBM fought strongly for an open tender which is now required under EEC and GATT rules.

Low stock levels 'a threat to recovery'

BY MAX WILKINSON, ECONOMICS CORRESPONDENT

A LOW LEVEL of stocks in the UK economy could pose a threat to recovery by encouraging imports, the Fraser of Allander Institute warns in its Economic Quarterly Review published today.

The institute, which is part of the University of Strathclyde, says that so far there is little evidence of a substantial return to stockbuilding in the UK.

Since real rates of interest remain high, the costs of increasing the ratio of stocks to output are significant.

The institute says: 'The implications of this development are twofold: firstly without a return to lower real rates of interest the upward impetus normally generated at this stage of the cycle by the rebuilding of stocks will be drastically reduced.'

Secondly, if British businesses now expect to work with permanently lower stock/output ratios, their capacity to meet unforeseen changes in demand

will be reduced.

'If domestic suppliers are unable to meet sudden increases in orders, purchasers will inevitably turn to foreign suppliers to fulfil their requirements.'

The institute says that any move towards permanently lower stock levels could be very dangerous unless accompanied by an increase in the flexibility of production.

The institute also points out that it will be impossible for all countries to achieve a recovery based on higher exports and restricted home demand.

'While individual governments may see this as desirable, it is only concerted action to increase demand which will pull the world economy out of recession.'

It says countries like the UK with very large trade surpluses will come under the strongest pressure to take action to reflate their economies.

It argues that devaluation would not be able to provide much of a stimulus to the economy 'without adversely affecting prices. And it says no reflexionary policy can avoid the risk of increasing the rate of price inflation, even when extra government spending is not involved.'

It says: 'The Government must surely be aware of this and the likelihood that it will be prepared to run such risks must be increasing as the election looms ever closer.'

The Fraser of Allander Institute Quarterly Economic Commentary Vol 6 No 1. University of Strathclyde, 100 Montrose Street, Glasgow. £2.

Statement on Lear talks possible

By Our Belfast Correspondent

LEAR FAN, the Northern Ireland company which has more than £30m of Government backing for a plan to build a carbon fibre executive aircraft, may this week indicate the progress of negotiations to raise over one private investment.

The U.S. parent company, Learvair Corporation, is having talks with several interested parties who might supply the estimated £50m needed to see the aircraft through its certification programme and into production.

Reech Aircraft Corporation, a leading U.S. light aircraft manufacturer, is said to be considering a bid for the company. Beech's chief executive, Mr. Gordon Blue, resigned as Lear Fan's managing director in April.

Saudi Arabian investors, acting through a European company, have also been in talks. Lear Fan directors were not available yesterday to comment on a report that a decision on the refinancing options would be made on Thursday.

The Government initially committed £27m of redeemable loans and grants to the project, and added a further £7m earlier this year while the search for private capital continued.

The Northern Ireland Department of Commerce, which has a minority holding, would say only that it was closely in touch with the situation.

Twelve De Lorean sports cars which have been held by Northern Ireland Carriers against a £67,000 debt are to be publicly auctioned on September 14.

TENDERS MUST BE LODGED AT THE BANK OF ENGLAND, NEW ISSUES (2), WAITING ROOM, 25th AUGUST 1982, OR AT ANY OF THE BRANCHES OF THE BANK OF ENGLAND OR AT THE GLASGOW AGENCY OF THE BANK OF ENGLAND NOT LATER THAN 3.30 P.M. ON WEDNESDAY, 25th AUGUST 1982.

ISSUE BY TENDER OF £250,000,000

2½ per cent INDEX-LINKED TREASURY STOCK, 2001

PAYABLE IN FULL WITH TENDER INTEREST PAYABLE HALF-YEARLY ON 24th MARCH AND 24th SEPTEMBER

- 1. The Stock is an investment falling within Part II of the First Schedule to the Trustee Investments Act 1961. Application has been made to the Council of the Stock Exchange to admit the Stock to the Official List.

- 2. The GOVERNOR AND COMPANY OF THE BANK OF ENGLAND are authorised to receive tenders for the above Stock.

- 3. The principal of the Stock will be a charge on the National Loans Fund, with recourse to the Consolidated Fund of the United Kingdom.

- 4. The Stock will be registered at the Bank of England or at the Bank of Ireland Belfast, and will be transferable on the register by instrument in writing in accordance with the Stock Transfer Act 1983. Transfers will be free of stamp duty.

- 5. If not previously redeemed under the provisions at paragraph 14, the Stock will be repaid on 24th September 2001. The value of the principal on repayment will be the amount of the Stock plus interest on the principal to the date of repayment, and the index rate applicable to any month will be equal to the index figure applicable to that month divided by the index figure applicable to August 1982.

- 6. For the purposes of this prospectus, the index figure applicable to any month will be the index figure for the month of the relevant month end relating to the month before that month; 'month' means calendar month; and the index rate applicable to any month will be equal to the index figure applicable to that month divided by the index figure applicable to August 1982.

- 7. The amount due on repayment, per £100 nominal of Stock, will be £100 multiplied by the index rate applicable to the month in which repayment takes place. This amount, expressed in pence starting to four places of decimals rounded to the nearest figure below, will be announced by the Bank of England not later than the business day immediately preceding the date of the penultimate interest payment.

- 8. Interest will be payable half-yearly on 24th March and 24th September, in cash or by cheque, and will be transmitted by post.

- 9. The first interest payment will be made on 24th March 1983 at the rate of £7.5044 per £100 nominal of Stock.

- 10. Each subsequent half-yearly interest payment will be at a rate, per £100 nominal of Stock, of 25 multiplied by the index rate applicable to the month in which the payment falls due.

- 11. The rate of interest for each interest payment other than the first, expressed as a percentage in pence starting to four places of decimals rounded to the nearest figure below, will be announced by the Bank of England not later than the business day immediately preceding the date of the previous interest payment.

- 12. If the index is revised to a new base after the Stock is issued, it will be necessary for the purposes of the preceding paragraphs, to calculate and use a national index figure in substitution for the index figure applicable to the month in which repayment takes place and/or an interest payment falls due ('the month of payment'). This national index figure will be calculated by the Bank of England on the basis of the index figure which would have been applicable to the month of payment, and such substitute index figure shall be used for all purposes for which the actual index figure would have been relevant. The calculation by the Bank of England of the amounts of principal and/or interest payable on the basis of a substitute index figure shall be conclusive and binding upon all stockholders. No subsequent adjustment to such amounts will be made in the event of subsequent publication of the index figure, which would have been applicable to the month of payment.

decide that any tender should be accepted (the allotment price). All allotments will be made at the allotment price and tenders which are accepted and which are made at a price above the allotment price will be allocated at the allotment price to the Governor and Company of the Bank of England, Issue Department.

19. Letters of allotment in respect of Stock allotted, being the only form in which the Stock may be transferred prior to registration, will be despatched by post at the risk of the tenderer, but the despatch of any letter of allotment, and any refund of any excess amount paid, may at the discretion of the Bank of England be held subject to the tenderer's cheque having been paid, in the event of such withholding, the tenderer will be notified by letter by the Bank of England of the acceptance of his tender and of the amount of Stock allotted to him, subject to such cash in payment of his cheque, but such notification will confer no right on the tenderer to transfer the Stock as allotted.

20. No allotment will be made for a less amount than £100 Stock, in the event of partial allotment, or of tenders at prices above the allotment price, the excess amount paid will, when returned, be remitted by cheque despatched by post at the risk of the tenderer; if no allotment is made the amount paid with tender will be returned likewise. Non-payment on presentation of a cheque in respect of any Stock allotted will render the allotment of such Stock void and the amount paid will be returned to the tenderer. Interest-Bank of England Order 3 and Co., 15 Mark Lane, London, EC3R 7DF. Rate for seven day deposits in sterling ('LIBOR') plus 1 per cent per annum may, however, be charged on the amount payable in respect of any allotment of Stock for which payment is accepted after the due date. Such rate will be determined by the Bank of England by reference to market quotations, on the due date for such payment, for LIBOR obtained from such source or sources as the Bank of England shall consider appropriate.

21. Letters of allotment may be split into denominations of multiples of £100 in written requests received by the Bank of England, New Issues, Waiting Street, London, EC4M 3AA, or by any of the Branches of the Bank of England, on any date not later than 24th September 1982. Such requests must be signed and must be accompanied by the tenderer's cheque, accompanied by a completed registration form, may be lodged for registration in any case if they must be lodged for registration not later than 1st October 1982.

22. Tender forms and copies of this prospectus may be obtained at the Bank of England, New Issues, Waiting Street, London, EC4M 3AA, or at any of the Branches of the Bank of England, or at the Glasgow Agency of the Bank of England, 25 St. Vincent Place, Glasgow, G1 2EB; at the Bank of Ireland, Marine Buildings, 1st Floor, 20 Collier Street, Belfast, BT2 5SH; at Mullens & Co., 15 Market Street, Dublin, D02 XN12; or at any office of the Stock Exchange in the United Kingdom.

RANK OF ENGLAND LONDON 25th August 1982

THIS FORM MAY BE USED TENDER FORM

This form must be lodged at the Bank of England, New Issues (2), Waiting Street, London EC4M 3AA not later than 10.00 A.M. ON THURSDAY, 25th AUGUST 1982, or at any of the Branches of the Bank of England or at the Glasgow Agency of the Bank of England (25 St. Vincent Place, Glasgow G1 2EB) not later than 3.30 P.M. ON WEDNESDAY, 25th AUGUST 1982.

ISSUE BY TENDER OF £250,000,000

2½ per cent Index-Linked Treasury Stock, 2001

TO THE GOVERNOR AND COMPANY OF THE BANK OF ENGLAND

I/We tender in accordance with the terms of the prospectus dated 20th August 1982 as follows:

Table with 2 columns: Amount of above-mentioned Stock tendered for, being a minimum of £100 and in a multiple of £50; and 1. NOMINAL AMOUNT OF STOCK

Sum enclosed, being the amount required for payment in full, i.e. the price tendered for £100 the nominal amount of Stock tendered for—

The price tendered per £100 Stock, being a multiple of 25p (tenders lodged without a price being stated will be rejected)

I/We request that any letter of allotment in respect of Stock allotted to me/us be sent by my/our post to me/us at the address shown below.

SIGNATURE of, or on behalf of, tenderer

PLEASE USE BLOCK LETTERS

Form with fields for MR/MRS/MISS, FORENAME(S) IN FULL, SURNAME, FULL POSTAL ADDRESS, POST-TOWN, COUNTY, POSTCODE, and STAMP OF LODGING AGENT (IF ANY)

A separate cheque must accompany each tender. Cheques should be made payable to 'Bank of England' and crossed 'Treasury Stock'. Cheques must be drawn on a bank in, and be payable in, the United Kingdom, the Channel Islands or the Isle of Man.

Each tender must be for one amount and at one price which is a multiple of 25p.



The 20,000-tonne concrete loading column is manoeuvred out of Howard Doris's dry dock into Loch Kishorn.

Loading column will replace oil pipeline

BY RAY DAFIER, ENERGY EDITOR

A UNIQUE piece of oilfield equipment—a £29m concrete loading column—is making a slow journey around the north of Scotland to Phillips Petroleum's Maureen Field, 163 miles north-east of Aberdeen.

The 10,000 tonne column, some 430 ft tall, is being towed from the Inner Sound, off Skye, following its construction in Howard Doris's dry dock at Loch Kishorn in Ross and Cromarty. The tow is expected to take about 20 days and should enable the structure to be positioned early next month.

The column will be used to load tankers of up to 85,000 dwt tons at a rate of 20,000 barrels an hour. It is one of a number of innovations being introduced by the Phillips consortium in the Maureen Field.

In order to save offshore development work, production wells are being drilled through a steel frame placed on the seabed while the platform is being completed on shore. The wells will then be joined to the platform when it is positioned next summer. The loading column is being used instead of a pipeline direct to shore.

The innovations have been introduced as a result of the relatively small size of the field. Industry estimates put recoverable reserves at 170m barrels, compared with 2bn barrels in British Petroleum's Forties Field. Even so, the production and loading equipment—excluding drilling and well costs—is expected to cost over £1bn (£575m).

Production is expected to begin late next year or early 1984. The average output is expected to be 72,000 barrels a day.

Interests in the Maureen Field, lying in block 16/23, are Phillips (45.7 per cent), Fina Exploration (23.96 per cent),

Agip (17.26 per cent); Century Power and Light (9 per cent); Ultramar Exploration (6 per cent); and British Electric Traction (5 per cent).

Teset Services, a UK company providing well logging services for the oil industry, has signed a deal with Houston-based Petroleum Service Company.

Under the arrangement, worth a minimum of \$5m to Teset, Geosource will manufacture, use and market the UK company's range of tools and data analysis equipment in the U.S. and elsewhere. Teset, based in Basingstoke, Hampshire, will receive a royalty on all sales during the seven-year, technology agreement.

THE NORWEGIAN Government has allocated a new oil and gas exploration licence north of North Sea block 30/9, adjacent to the 'silver block' 30/6, where both oil and gas have been found.

The area is being opened to exploration so that the three Norwegian companies with stakes in block 30/8 can map the extent of reservoirs believed to extend into block 30/8, before planning development of the discovery as a whole.

The foreign oil companies with shares in 30/8 have not been included in this licence. It has been awarded to Statoil (70 per cent), Norske Hydro (15 per cent) and Saga Petroleum (10 per cent). A 5 per cent stake is being reserved for the time being, for possible later award to a fourth Norwegian oil company now in the process of being established.

Norske Hydro is said to be dissatisfied that it has received such a small stake in the new licence, particularly in view of the fact that it is to act as operator.

Labour attacks Sproat over criticism of BA

BY LYNTON McLAIn

OPPOSITION MPs, including a Shadow Cabinet member, reacted angrily yesterday to the warning by Mr John Sproat, the Aviation Minister, at the weekend of 'more tough measures' to make British Airways profitable and for sale by the next general election.

These new, unspecified measures 'will be introduced in the coming weeks', Mr Sproat said at Aberdeen on Saturday after he launched a 'timetable of action' to sell BA. Mr Sproat is Parliamentary Under-Secretary of State for Trade, in charge of the Government's plan to denationalise BA.

He also criticised the performance of BA and said: 'I could not believe the incompetence I encountered in BA only 11 months ago. It was a quagmire of perks and privileges.'

Mr Sproat's comments are reminiscent of further cuts and job losses at BA, despite Sir John King, the BA chairman, having said last week that suggestions of further redundancies were 'absolute rubbish.'

'First, we take British Airways into a trading profit; second, we take it into overall profit; and third, we privatise it. It is my firm intention that we shall do it all before the next General Election.'

Mr Sproat praised Sir John King for his 'brilliant leadership' under which the 'stagnant loss-maker is being turned into a profit-maker.' BA is expected to report in September a loss of £350m or more for the 1981-1982 financial year.



Base Rate

BANK OF CREDIT AND COMMERCE INTERNATIONAL SOCIETE ANONYME LICENSED DEPOSIT TAKER

announces that from 23rd August 1982 its base rate is changed

from 11½% to 11% p.a.

100 Leadenhall Street London EC3A 3AD

هكذا من العمل

Resorts look for 'instant success'

SEASIDE HOTELS and guest houses in many British resorts this year are suffering the first full effects of the recession. The unemployed's redundancy payment blow-out on holidays by the sea, which has cushioned trade over the past two years, is tailing off.

It's not the English seaside we like to be beside in recessionary times, reports James McDonald

The loss of business from a big proportion of the unemployed, together with the longer term effects of a radical change in the pattern of British holidaymaking, is forcing the seaside to look closely at what it has to offer and how it can sell itself.

disliked and rejected by many hotel and guest house owners. A pilot scheme has been operating for two or three years but only this year, after two bad seasons, has it gained wider support.

Next year, about 12 resorts, including mighty Blackpool and Scarborough, are joining a project called "Holiday UK", offering hotel and guest house holidays through travel agents, and also in the "Instant Booking" scheme under which seaside holidays can be booked through tourist information offices in inland cities and towns.

It is a frank resort tourist officer or hotelier who admits to having had a disastrous year, but most are willing to talk of "appalling" trade elsewhere on the coastline.

Both schemes are supported by the English Tourist Board and by the British Resorts Association. Mr. Mitchell, Montague, chairman of the board, said in a statement that it is easier for Blackpool residents to book holidays in Benidorm than in their own town.

But this fluctuation itself reflects the basic change in the pattern of British holiday-making. Until a few years ago resorts expected people to react to their national Press advertising campaigns in January and February, to send off for a resort's brochure, choose a hotel and book a good five months or more in advance.

the British holiday often takes second or even third place. For those who have taken a main summer holiday by the Mediterranean, the British seaside resort has to compete with other British tourist attractions.

The percentage of all holidays in England by Britons spent at the seaside has declined from 39 per cent in 1979 to 36 per cent last year. Holidays in London, on the other hand, rose from 6 per cent to 8 per cent over the same period and holidays in other large inland English towns increased from 11 per cent to 12 per cent.

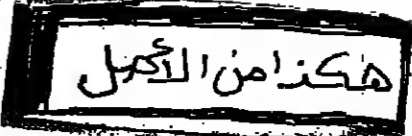
Moreover, many of these holidays are short breaks of two or three days and seaside hotels and guest houses have had to adjust—rather slowly in many cases—to this change and solicit mid-week and long weekend bookings.

grants to be made outside the industrial areas under Section 4 of the Tourism Act will be a stimulus.

The Tourist board has only about 55m available for grants this year but even this amount should be useful as a pump primer for investment by hoteliers in improved facilities.

A number of resorts are going to considerable lengths to attract trade with special events and attractions. Scarborough, with state aid, has spent about 10m on conference and hotel facilities.

Blackpool, also traditionally dependent upon the industrial Midlands and the North West and North, experienced comparatively good business in March and April but then went through a very bad patch. In the town council used 125,000 of next year's tourism budget for an advertising campaign.



Cohse may recall conference to seek escalation of health dispute

BY DAVID GOODHART, LABOUR STAFF

THE EXECUTIVE of the Confederation of Health Service Employees will meet later this week to discuss the possibility of recalling its annual conference to endorse an escalation of the 15-week health dispute.

Health service union leaders believe the dispute must be brought to a head as soon as possible, but the meeting of the TUC health services committee on Thursday is unlikely to back moves for an all-out strike.

But under continuing pressure from the National Union of Public Employees, to back an all-out strike Cohse may decide to recall its delegates.

emergency resolution to the TUC Congress in Brighton next month calling for the strike to be spread into other industries.

Mr Bob Jones, NUPE national officer, said yesterday: "We don't want to see this dispute lingering on. A number of consultants have told us that the longer it lasts the more difficult it will be to repair the damage—so we want to bring it to a head."

Mr Jack Boddy, national secretary of the Transport and General Workers Union's farmworkers section, has urged his 90,000 members to back the health workers' 12 per cent claim in any way possible.

'Crazy' EEC finances attacked

By Our Labour Editor

THE TUC has cast its first stone in a so-far low key campaign against UK membership of the European Economic Community.

A leaflet published in co-ordination with Congress concentrates on the EEC's "crazy finances" and says it is "time to cry halt."

It says the UK will pay a net contribution to the EEC this year of £500m—the second highest level of all countries' budget payments, in spite of this country's having the third lowest income per head.

Talks today on pay row in Mersey docks

By Our Labour Staff

THE LIVERPOOL Port Employers' Association will meet the Mersey Docks shop stewards today in an attempt to stop a possible vote for strike action at a mass meeting of the Mersey's 2,500 dockers tomorrow.

Postal workers' leaders face secret ballots

BY DAVID GOODHART, LABOUR STAFF

THE CHANGE was agreed at the Union of Communication Workers' rules revision conference by 90,730 votes to 73,620 this weekend. The rule affects only newly-elected officers and does not apply to the union's 13 full-time officers who have been elected for life.

men's union (FBU) and the Civil and Public Services Association. All three are lefties and the issue in many other unions has created an unusual alliance union between left-wingers and trade union reformers in the Government.

BL firemen fail in jobs appeal

EIGHT BL firemen who were sacked after allegations that they slept on duty have failed to win their jobs back.

BUSINESSMAN'S DIARY UK TRADE FAIRS AND EXHIBITIONS

Table with columns: Date, Title, Venue. Lists various trade fairs and exhibitions such as Motor Cycle Show, International Hardware Trades Fair, etc.

OVERSEAS TRADE FAIRS AND EXHIBITIONS

Table with columns: Date, Title, Location. Lists international trade fairs like International Men's Wear and International Jeans Fair, etc.

BUSINESS AND MANAGEMENT CONFERENCES

Table with columns: Date, Title, Location. Lists business conferences such as Management Training Consultants, Oyez/IBC Deep water pipeline technology, etc.

Paper for black Londoners

By Lisa Wood

THE FIRST newspaper for London's blacks, The Voice, will be on newsstands at the Notting Hill Carnival on August 26.

The Voice is aimed at British-born blacks, unlike the expatriate-oriented, more militant Caribbean Times. It will have a weekly print run of 50,000 and cost 20p.

Waterways freight survey

By Andrew Fisher

BRITAIN'S inland waterways carry over 60m tonnes of freight a year, according to the first official survey of such traffic in the UK.

The survey was compiled for the Departments of Transport and the Environment by Liverpool University's Marine Transport Centre.

It says traffic carried on inland waterways accounts for 1.5 per cent of UK freight when measured in tonne-kilometres. In 1980, 62m tonnes of freight went on inland waterways and estuaries, or 2.3m tonne-kilometres.

Call for drug prices inquiry

THE EUROPEAN Commission has been asked to investigate claims that drug companies are charging the National Health Service up to 10 times more for their products than they do in other countries.



Advertisement for Shorts wide-bodied regional airliners. Text: 'SHORTS WIDE-BODIED REGIONAL AIRLINERS ARE READY FOR THE 1980s'. Includes details about efficiency and passenger capacity.

BUILDING AND CIVIL ENGINEERING

Slump in cavity wall insulation

ORDER BOOKS of cavity wall insulation companies have slumped by as much as 75 per cent. At least two companies have gone out of business and others are seriously threatened with extinction following a television news report on allegations of possible health hazards arising from the use of urea-formaldehyde foam.

The Association, however, says that there is no medical evidence of long term health hazards from using UF-foam and that where urea-formaldehyde vapour has escaped into the air, usually because of a defect in a building, the problem has been easily rectified.

There is no doubting the serious damage that has been done to the industry as a result of a series of newspaper and television reports on the use of UF-foam in cavity wall insulation.

Mr Cameron said that sales of other home insulation products, unconnected with UF-foam, had been adversely affected by the recent publicity. "We run a fibre glass insulation business and orders here are also down by 75 per cent. I know of at least one polystyrene injection company which has gone bust because of the lack of home insulation orders," said Mr Cameron.

Companies using urea-formaldehyde foam for cavity wall insulation say that they have been inundated with calls from worried householders cancelling orders following a report broadcast on ITV's News at Ten on July 5.

The Association said that recent checks on homes with UF-foam insulation had shown higher readings of formaldehyde vapour from household and consumer goods, such as cigarettes, bread and hair sprays, than from the UF-foam in the cavity wall.

Mr Porter said that he would be able to survive because of his other business interests in stone cladding and in wood-worm, dry rot and dampness treatment. He intended to remain in cavity wall insulation but said that business had got so bad that instead of running ten (two man) teams of installers he was now down to just two teams.

Mr Ken Johnson, managing director of Warmwall, which installs a wide range of insulation products in the domestic market, said that orders at his company had fallen by about 45 per cent in the past two months, across the whole range of the company's products.

The National Cavity Insulation Association—which recently has been receiving up to 50 telephone calls a day from concerned home-owners—says that UF-foam can, in very few cases, give off an unpleasant smell which might irritate the eyes or respiratory tracts of some individuals.

There have also been reports of problems with some UF-foam insulated buildings in the UK. The association, however, stresses that genuine problems are extremely rare and are usually encountered because the foam has either been installed improperly or in an unsuitable or defective building and that these cases have not resulted in long term health hazards.

Mr David Cameron, chairman and 60 per cent owner of Megafoam Limited said that normally at this time of the year his company would hope to be achieving around 150 orders a week. Before July the company had been achieving around 80 orders a week. In the past four or five weeks orders had been averaging just 23 a week.

Mr Baker, who is also chairman of the National Cavity Insulation Association, said: "The industry will survive. It has had these setbacks before; but there is no doubt that some companies are seriously under threat."

ANDREW TAYLOR

Falklands airstrip: learning from the past

REPORTS that the Government is considering a new 11,000 ft airstrip for the Falkland Islands has revived memories of the building of the present Port Stanley airfield by Johnston Construction in 1975.

Johnston Construction, part of the Reigate based Johnston Group, the engineering, building materials and contracting company, had the benefit of building the existing Port Stanley airfield when more peaceful relations existed between Britain and Argentina.

Johnston also used some Argentine labour to complete the £5.4m contract. Some of the Falkland islanders also worked on the project, together with a team of about 40 sent out from Britain.

Mr Johnston said that the Falkland islanders were a useful addition to our team and proved very resourceful with machinery and plant which had broken down in some of the arduous conditions we had to deal with. We never lost a single day's work throughout the entire project," says Mr King.

UK CONTRACTS New housebuilder wins major project

A COMPANY formed five months ago to build homes for sale will start soon on an £8.1m development. A 20-acre site is to be developed by JOHN WILMOTT HOMES. Houses will be built at Barford Road, Eynesbury, St Neots, Hunting, creating a series of village hamlets, each with about 50 to 60 houses. They will be especially suitable for first time buyers, and couples with young families with prices ranging from £17,750 to £26,000.

There is outline planning permission for homes on the site, which the company is developing in association with R. H. Wales, of Gamlingay. Talks will begin soon with the local planning authorities about details of the 1.2 and 3 bedroomed houses. The St Neots site is about three-quarters of a mile from the town centre, close to two schools and a parade of local shops. Work should begin in October 1982, with the first house ready about five months later. John Wilmott Homes is part of the John Wilmott Group of Sheffield, Beds.

FOUR CONTRACTS, together worth nearly £5m, have been awarded to TARMAC regional construction companies. The largest, worth more than £1.5m, is in Scotland and will be carried out by Cubitts. It is for studies and offices, at Clydebank Business Park, for Radio Clyde, Glasgow-based commercial radio station. Work on the two-storey building has started, for completion in 14 months.

Mr Cameron said that sales of other home insulation products, unconnected with UF-foam, had been adversely affected by the recent publicity. "We run a fibre glass insulation business and orders here are also down by 75 per cent. I know of at least one polystyrene injection company which has gone bust because of the lack of home insulation orders," said Mr Cameron.

Other major schemes include a PSA £1.3m contract for the construction of a reinforced concrete warehouse at Falmouth, new housing at Penance, and hospital work at Truro.

OSROY ROAD Developments has awarded the main building contract of around £3m for the Colonnades shopping centre and new office complex in central Doncaster to FAIRCLOUGH BUILDING.

BOUYANT IN the north east is the BOWEY GROUP, which reports general and housebuilding work totalling £5m. Leading the projects awarded to the general building side is a conversion and upgrading office accommodation scheme at Tanfield Lea for Ever Ready (GB). Other work covers sheltered housing developments at Altwick for the Royal British Legion Housing Association, refurbishment in Newcastle upon Tyne for Greater London Properties, e

CONTRACTS VALUED at £4.8m have been awarded to companies in the CARWRIGHT GROUP, comprising four housing contracts, in both the private and public sectors, and a pumping station project on the River Wye. The latter involves construction by Davies Middleton & Davies, Cardiff, for the Welsh Water Authority of a pumping station and water abstraction plant on the River Wye at Monmouth, Gwent (value £1.38m).

SCHWEPES has awarded contracts worth over £2m to Newcastle-based builders F. WHEELAN to build a £1.7m production and administration complex at Aylesbury and a £300,000 distribution depot at Colchester.

OVERSEAS CONTRACTS First Nigerian job for Sir Alfred McAlpine

SIR ALFRED McALPINE (OVERSEAS) is to work in Nigeria for the first time in the company's history, with the winning of a £50m award for a health project there for the Plateau State Government, east of Abuja.

The contract will be funded by a loan to the State, led and syndicated by the Midland Bank, and composed partly of an ECGD supported export credit and partly of a Eurocurrency credit. Balfour Beatty Engineering is the managing contractor for the Plateau State Government. McAlpine says that the contract is expected to take about 2 1/2 years to complete.

Bryant construction Tailored space for businesses SOLIHULL READING

Around the industry

THE FIRST seminar and forum on phenolic insulation to be mounted by the materials manufacturing trade association, the FIMA, is to be held on October 13 in Belgrave House, Buckingham Palace Road, London. It will be followed by a further presentation in the George Hotel, Edinburgh on November 24.

The seminars are intended for architects and other specifiers, fire officers and building managers concerned with energy savings and fire safety in the building construction and heating and ventilating industries.

UNDAUNTED BY the recession, Shores Trench Systems is continuing to expand its business on a number of fronts with the acquisition of Sling and Tackle (the northern based producer of nylon slings, lifting chains and specialist beam pulleys), new factory and office space for Isaac company Spectra Alignment and, in France, has formed Le Blingage Hydraulique to sell or hire its traditional range of trench support systems in France, Belgium, the Netherlands and Switzerland.

A TOTAL of 32 students have passed the 1982 Guild of Architectural Ironmongers third year examination in quality for a Dip GAL Five prizewinners this year receive cash awards, including number one winner Mr George Robinson, Macnaughton Road, Belfast, who won the gold medal and a £50 cash prize.

TERRAPIN has created a new subsidiary company, Bond Estates, to manage and develop the group's 22 acre Milton Keynes freehold site. Two major developments planned over the next two years will involve 511m.

THIS YEAR'S London Building and Construction Show which opens in a three-day event, begins on September 21 at the Bloomsbury Court Hotel, Russell Square, W.C.1.

REPUBLIQUE DE HAUTE-VOLTA

Unité-Travail-Justice MINISTERE DES TRAVAUX PUBLICS, DES TRANSPORTS ET DE L'URBANISME DIRECTION GENERALE DES TRAVAUX PUBLICS TENDER No. 02-12-TP-82

I. OBJECT: The Minister of Public Works, Transportation and Urbanization of Haute-Volta is issuing an open call for bids to carry out improvement works to the traffic areas of BOBO DIULASSO Airport, in order to make it accessible for OC-8 type aircraft.

II. QUANTITIES: main quantities concerning this tender are the following: Alternative embankings 600,000m³, Laterite for foundation layer 12,000m³, Laterite cement for base layer 7,500m³, Laterite for jet engine exhaust bolts 900m³, Impregnation 40,000m³, Micro bituminous concrete for running layer 300T, Micro bituminous concrete for jet engine exhaust belt 100 metres, Flagged gutter 5,000m², Oxy-baconing paint 7,500m², Jet engine exhaust screen 1 Unit.

CONTRACTS AND TENDERS

KINGDOM OF MOROCCO

OFFICE NATIONAL DE L'EAU POTABLE CALL FOR TENDER No. 4/D/SP/82 RECRUITMENT OF CONSULTANT IN THE FIELD OF DRINKING WATER Within the framework of the 3rd Drinking Water project, financed by (IBRD) the Office National de l'Eau Potable (ONEP) wishes to recruit the services of six consultants in the field of Drinking Water, specialised in the following spheres:

KINGDOM OF MOROCCO

OFFICE NATIONAL DE L'EAU POTABLE CALL FOR TENDER No 26/DE/82 SUPPLY OF DRINKING WATER TO THE TOWN OF AL HOCEIMA AND AREA "The Office National de l'Eau Potable (ONEP) informs the Companies wishing to participate in the International call for the above mentioned tender that the closing date for submitting the bids, previously set for 26th July 1982 has been extended to Wednesday 29th September 1982, before 6 p.m.

ALGERIAN PEOPLE'S DEMOCRATIC REPUBLIC

MINISTRY FOR ENERGY AND PETROCHEMICAL INDUSTRIES NATIONAL DRILLING COMPANY E. N. A. F. O. NOTICE OF INTERNATIONAL CALL FOR TENDERS No. IN 19.82 "ENAFOR" is launching an International Call for Tenders for the supply of: 25 NO. HEAVY TANKER-TYPE VEHICLES This Call for Tenders is aimed solely at manufacturing companies, accepting consortia, representatives of companies and other intermediaries, in accordance with the provisions of Law No. 78.02 dated 11 February 1978 providing State monopoly for Foreign Trade.

INTERNATIONAL NOTICE OF CALL FOR TENDERS

For the supply of MINING EQUIPMENTS - METALLURGICAL PLANTS No 82/8 - 82/7 - 82/8 Issued by the REPUBLIC OF ZAIRE (La Générale des Carrières et des Mines - GECAMINES) for a project which may be financed by the European Economic Community, European Development Fund, pursuant to Title II - Mineral products - of the Second Lomé Convention (SYSMIN).

KINGDOM OF MOROCCO

OFFICE NATIONAL DE L'EAU POTABLE CALL FOR TENDER No 26/DE/82 SUPPLY OF DRINKING WATER TO THE TOWN OF AL HOCEIMA AND AREA "The Office National de l'Eau Potable (ONEP) informs the Companies wishing to participate in the International call for the above mentioned tender that the closing date for submitting the bids, previously set for 26th July 1982 has been extended to Wednesday 29th September 1982, before 6 p.m.

PEOPLES DEMOCRATIC REPUBLIC OF YEMEN

PUBLIC CORPORATION FOR ELECTRIC POWER HEDJUF NEW 11KV SUBSTATION The Public Corporation for Electric Power invite tenders for the following contract which is being financed by the Corporation: Hedjuf New 11KV Substation And Contract 8018/81.

CLUBS

THE GUILD OF ST. JAMES'S, London's No 20 club, has announced that it is seeking 20 new members. The club is situated in the heart of the City, near the Strand, and has a fine dining room, bar and billiard room.

PERSONAL

EXCLUSIVE VIDEO CLUB VHS, Beta Etc. Tel. 0373 830563 day or evenings

CLASSIFIED ADVERTISEMENT RATES

Table with 3 columns: Category, Per column, Single column. Includes Commercial & Industrial, Residential Property, Business, Investment, etc.

ART GALLERIES

GALERIE GEORGE offers an interesting selection of contemporary art. Located in the heart of the City, near the Strand, and has a fine dining room, bar and billiard room.

EQUIPMENT FOR SMALLHOLDER SUGAR DEVELOPMENT

Tenders are invited for the supply of the following equipment to be financed by the African Development Fund. Goods must be produced in the territories of state participants or member countries.

CONTRACTS & TENDERS ADVERTISING APPEARS EVERY MONDAY

THE RATE IS £27.50 per single column centimetre.

MANAGEMENT

EDITED BY CHRISTOPHER LORENZ

Closer together—but still wide apart

Employee consultation has been more prevalent during recession, but a union backlash is feared. John Elliott reports

DURING THE recession the amount of communication between managements and workforces about company problems has often increased considerably. But genuine consultation and participation, in which employees have a real chance of influencing management decisions, has not increased to anything like the same degree.

Managers have been keen to cushion the shock of redundancies and closures by spelling out the worst news about potential problems to their employees. But they have often been forced to go ahead and take action without involving the employees in further consultation.

The challenge for management when the recession eases—or at least bottoms out enough for companies to take stock of their long-term relationships—will be to turn these somewhat negative forms of consultation into a more permanent and positive dialogue.

One of the problems that will then emerge will be the varying views which are often held by managers and trade union activists within a company about the management styles and consultative exercises of the past two or three years.

Conversations with managers and trade unionists in a number of companies in the past year suggest that whether or not relationships appear placid or even harmonious on the surface, there are often sharp differences of opinion.

"We tell the shop stewards things about the company's performance and plans that we wouldn't have even told our operational managers five years ago," says Bob Roberts, East Anglia regional personnel manager for the Birds-Eye Walls part of the Unilever group, explaining his company's consultation system. "That may be so but we haven't had an impact on actual company policy," rejoins the stewards.

At BL, with its history of troubled labour relations, the difference is far sharper and bitter. "Our labour force has gone out of its way to co-operate with us. Things can always improve more but I have no complaints," says Harold Musgrove, the tough, outspoken chairman and managing director of BL's Austin Rover division. Meanwhile, David Buckle, TGWU Oxford district secretary, claims that "at present it's a waste of time putting a view to management that they don't want to hear."



Co-operation by the workforce "can always improve but I have no complaints," says Harold Musgrove (left) chairman of Austin Rover. Meanwhile, David Buckle, TGWU Oxford district secretary, claims that "at present it's a waste of time putting a view to management that they don't want to hear"



Hugh Routledge

lodge with management when times improve and when there is a chance of sufficient shop floor support to make it worth while raising issues which might lead to disputes.

These claims—and David Buckle's other complaints—are more associated with losing traditional trade union bargaining rights than with the limitations of employee consultation and participation evident at Birds Eye in East Anglia. But in all such cases the recession will leave in its wake frustrations that the parties involved may be tempted to try to vent.

How serious all this will turn out to be cannot yet be assessed. Inevitably during a recession most employees are not likely to want to share in decision-making about cut-backs and redundancies. Equally their employers are not usually likely to want to share their new-found managerial authority or to slow down their closure decisions.

Birds Eye's consultative arrangements do however seem to have remained intact more effectively than similar systems at some other companies. Like many groups, Unilever stopped

up its arrangements during the Bullock debate of the late 1970s, and created a series of company councils.

At Birds Eye's Lowestoft factories, where the main business is freezing vegetables, there are two tiers of consultation—a factory consultative council which meets every two months and monthly departmental or production line consultative meetings, in addition to a higher-level company council which meets every three months.

Representatives for the factory council are elected by all employees, not just trade union members—mostly Transport and General Workers. This has led both union activists and others being chosen, although the factory's full-time chief shop steward always attends by invitation.

Although such an arrangement might be resisted in more militant factories, the shop stewards accept this non-union basis, providing the company does not try to deal with negotiable matters, such as terms of redundancy, in the council. In some ways the separate identity helps the union to stop the lines

types of issue—for example the location of cycle racks apparently dominated a recent meeting when 170 redundancies were on the agenda.

However, on one occasion nine months ago when a council meeting was widened to include all shop stewards for the annual visit of the Birds Eye chairman, more was achieved. The issue was the removal to Hull of plait processing—the last fish work left in the Lowestoft factory. This would have caused 150 or more job losses, and an emotional debate took place. As a result the employees agreed to co-operate in modernising the plait processing and the company is spending about £300,000 on a new fish grader which will displace with about 40 jobs.

So on the surface it looks as if everyone should be pleased if not proud of their participative achievement. But the shop stewards do not believe they have changed Birds Eye's basic policy of shifting fish handling to Hull, and moving out of plait processing—primary decisions which they had no chance, they say, to influence. They seem to be worried that their victory may be short-lived.

The management believes more is achieved in the production line consultative sessions. Everyone attends, which means there is personal, not just representative, involvement. Production lines are stopped for the meetings which are attended by perhaps 10 to 30 people. Here the emphasis is on detailed production results and targets.

The changes at BL have been far more wide-ranging and involve the dismantling of the old consultative system and a dramatic toughening of management style. Stories are told of managers being abusive not only to shopfloor employees and to union representatives but also to their own managerial subordinates in front of shop stewards.

Few people doubt the effectiveness of such methods in helping to turn BL round; but equally, few people can regard them as a satisfactory permanent style of management. David Buckle insists that there have been no significant changes in management style during the past year, despite the pledge by

Mr Michael Edwards during last November's pay dispute that the style would change.

"I believe that everyone accepts that if they see managers being expected to work hard and not being allowed to be incompetent, then they realise incompetence is not acceptable at any level," says Musgrove.

Questioned further about the allegedly rough management style he says: "It has been hard and it will have to stay hard. But at least there is consistency—no one is spared and when it comes right people are complimented."

He does not believe there will be a backlash one day. "Why should there be when people have got a sense of pride in what they produce and when we are seeking security of employment for them?" he asks.

In any case, he says that consultation is being restarted. Business review meetings have been held at division and factory levels for shop stewards, but these seem to be only exercises in one-way communication.

Austin Rover is also starting a limited experiment in a form of job involvement, taking people from different disciplines and levels of seniority in Austin-Rover to tackle a certain problem—like the design and production of car seats.

Such an initiative is a far cry from the old days of interlocking tiers of consultative committees, which actually discussed BL's detailed commercial plans. But at least it could be a tentative step forward.

The problem now for companies like BL is that one day there may be a backlash as union activists try to reassert their lost authority. Managers at all levels of industry differ sharply about the size and the seriousness of the risk of a backlash.

But both the Government and the Confederation of British Industry recognise that constructive development of positive participation schemes could help to defuse the risk of trouble, as well as paving a way for merging managers' new-found authority with a more acceptable participative style.

Management abstracts

Flexible manufacturing systems. R. E. Young and H. T. Klaber in Industrial Engineering (U.S.), Nov 1981. Defines a "flexible manufacturing system" in terms of computer-controlled machines and transfer devices that can process many types of part; lists hardware and software elements, describes applications, and explains in detail the software requirements for communication, control and machining. Portfolio management in diversified companies. R. A. Bettis and W. K. Hall in California Management Review (U.S.), autumn 1981. Examines how ten unnamed companies assess the contribution of divisions. ("strategic business units"); finds that this portfolio concept is used as an analytical aid, but—because of the massive commitment needed for implementation—is not used as an "entire system of management." Pricing new products. J. Thorn in Industrial Marketing Digest (U.K.), Vol 7 No 1. Argues that for new, specialised industrial products, mathematical models and provisional costs are unhelpful in pricing; offered an approach which starts off with a detailed assessment of qualities differentiating a product from its competitors; discusses how a starting price should be modified by market variables such as advertising and agents' discounts. Interpersonal skills in business strategy. S. H. Hoch in Research Management (U.S.), Nov 1981. Explains how the (U.S.) General Electric Company attempts to "control its future" by analysing opportunities and threats, evaluating responses, and initiating environmental forecasts with strategy formulation; exemplifies the approach with thumbnail sketches of the company's Brazilian operations. Interpersonal skills of leadership. P. L. Wright and D. S. Taylor in Leadership and Organisation Development Journal (U.K.), Vol 2 No 2. Contends that leadership depends on the use of certain interpersonal skills; describes and classifies them, and gives examples of appropriate/inappropriate use; relates the ideas to theories of leadership. These abstracts are condensed from the abstracting journals published by Anbar Management Publications. Licensed copies of the original articles may be obtained at £2.50 each (£3 each from September 1, including VAT and p+p; cash with order) from Anbar, PO Box 23, Wembley HA8 8DJ.

Initiative

Such an initiative is a far cry from the old days of interlocking tiers of consultative committees, which actually discussed BL's detailed commercial plans. But at least it could be a tentative step forward.

TECHNOLOGY

First commercial versions of Sony's new disc player are off the production line

Europe waits for Sony's little miracle

BY ELAINE WILLIAMS

SONY REVEALED the first production versions of its revolutionary compact disc player this week. Then it cast a shadow over this achievement by announcing it is to delay the full launch of the system in Europe until next year.



Preview of the new compact disc player.

Compact discs, jointly developed by Philips in the Netherlands and Sony in Japan, aim to provide sound quality presently unobtainable with conventional hi-fi systems. Each disc, measuring only 4 1/2 inches in diameter, can store an hour's music on a single side, coded digitally in the form of microscopic pits.

These tiny pits—formed in a spiral some 2 1/2 miles long—are buried beneath the surface of a protective plastic layer. The information on the disc is read by a laser stylus within the disc player. The disc lasts longer than conventional LPs and is unaffected by surface scratches (but not finger marks).

Sony attributes the delay in introducing the disc system to the inability to produce sufficient disc players to support the launch. Philips has also agreed to postpone its European launch to coincide with Sony.

Mr Tim Steel, Sony's UK general manager optimistically estimated that there will be a market of about 250,000 disc players in the first year of the UK launch.

several microprocessors to ensure that the laser can track the tiny spiral of pits and to provide the user with information about the disc being played.

The order of playing the disc can be programmed, and a digital read-out tells you which track is being played. In future discs, the titles of each track will be encoded on the disc so it can be displayed on the player.

Sony says that the arrival of

the disc—whenever it does arrive—will be timely for the record industry which has been facing severe difficulties in recent years. Sales of records have declined over a seven year period from 91m to just over 67m in 1980 in the UK alone.

This decline has been brought about by the combined effects of the recession, home taping of LPs and pirate tapes. The record industry estimated that in 1980 alone it lost £200m in revenue from home taping of music.

Optimism Despite Sony's optimism, there has been very little euphoria from the record companies about the compact disc. Only two major record companies, Polygram—partly owned by Philips—and CBS-Sony in Japan have invested and are now making compact discs.

Polygram has spent DM 100m in its plant at Hamburg which will have a capacity to make 5m discs a year. A modest compact disc making plant will set a company back £7m to £10m because compact disc making is a sophisticated process.

The process involves preparing a master disc by coating a

glass plate with a photoresistive material which is sensitive to ultraviolet light. A powerful laser beam cuts out the tiny microscopic pits which correspond to the digitally encoded audio signal.

After undergoing a silversing process, this glass master is pressed against a nickel plate to form a reverse copy. This nickel master is then used to make several production stampers.

Disks can then be made using injection moulding technique or stamped out in a similar way to conventional discs. Once stamped, the discs are covered in a thin layer of aluminium so it can be read by the laser stylus and finally a protective plastic layer is added.

Control 'Sitewatch' marshalls the data

LEE-DICKENS of Desborough, Kettering, has developed a simple system to collect information at dispersed points on large industrial or commercial sites and transmit it to a single display location.

Its 'Sitewatch' system uses a four-core bus cable from which spurs can be taken at any point to data collection substations.

The central processor in the system addresses each outstation in turn and allows a fixed time for reply; frequency is normally 25 outstations a second.

The information can be displayed on a light emitting diode display or on a vdu—the central processor can be programmed to take automatic action on receiving a signal. Lee-Dickens is on 0536 780155.

Welding Torvac's digital programmer

TORVAC HAS announced a new range of vacuum and electron beam welding equipment.

The Series H vacuum furnaces are horizontally loaded and offer options on the size of the working zone and on the method of vacuum pumping.

They are also fitted with a new digital programmer which allows for the specification of complex processing sequences—for example, harden and double temper, vacuum bake out followed by braze under hydrogen followed by cooling under inert gas or letting up to air and pumping down again in the same cycle.

Memories Rodime and Comart drive disc pact

RODIME, THE UK's only indigenous manufacturer of the 5 1/4 inch Winchester disk drives, has been seen as the key to personal computing power in the future, is to supply its drives to Comart for its 'Communicator' range of microcomputer systems.

These Winchester drives are small, tough and comparatively cheap when measured against conventional computer storage.

David Broad, Comart md said: "We have wanted to increase the British component content of the Communicator for some time now but were not prepared to make sacrifices on quality or quantity."

The Rodime drives give capacities of up to 263Kb with fast access.

Order from Comart on 0408 215005.

Office Vdu top file tray

The paperless office may be on the way... but not quite yet it seems. If you want to use the top of your visual display unit as filing space

Immac is a VDU tray in acrylic plastic. A slot in the front allows the contents to be picked up easily. It measures 12 ins by 18 ins by 2 1/2 ins and Immac claims it will fit all makes of VDU except those from Lear Siegler.

£19.00 each or £15 each if three are ordered. Immac is on 09285 67551.

Total capability in construction. Northwest Holst logo.

Electronics New zero force connectors

ITT CANNON has launched a new series of zero force connectors designed for 10,000 mating/unmating cycles without failure.

Designed for low cost, high performance multiple wire power and signal products, as many as 2496 contacts can be made.

Crimp or wire wrap contacts are available from 60 to 2496 contact positions. The plug and receptacle do not touch during mating until the connector halves have been fully engaged.

Current rating, eight amp; contact resistance 15 milliohms maximum; more from ITT Cannon on Basingstoke 3171.

Electronics How to kill static electricity

STATIC ELECTRICITY spells death to silicon chips, which is why electronic circuit assemblers wear anti-static clothing and earth themselves and their working tools before handling micro-electronic components.

Linvar of Leicester offers a range of equipment to defeat static electricity and create a static safe work area.

The equipment includes a work surface which continually drains charge from any conductive object placed on it, a wrist strap to integrate operators into the grounding system and shipping tubes. Top of the range is a complete conductive bench unit. More on 8333 769181.

A company whose customers hope never to use its products Brisco: where 'shutdown' is good business

BRISCO Engineering makes the sort of equipment its customers hope they will rarely have to use—emergency shutdown systems for oil production platforms and pipelines.

In October Brisco, a privately owned UK company, with a turnover of around £5.5m, will launch a new type of shutdown system for pipelines using a valve it had developed for its wellhead control system.

The new break-line valve system can detect—through a system of hydraulics—variations in pressures which might indicate a problem somewhere along the line.

The valve system nearest the break in the pipe will automatically cut the flow of oil further up the pipe.

The new system is part of Brisco's expansion plans, but as a relatively small company it faces fierce competition especially from the U.S. with companies such as Baker CAC which recently introduced a control valve too, Otis and Autococ, part of Cameco.

Despite the opposition, Brisco Engineering has won some notable success with major customers such as Phillips and BP in the North Sea and recently won an order to supply shutdown systems for the Bombay High Field in India.

The company began operating in 1968 mainly to provide an offshore oil engineering service to the growing number of gas platforms in the southern part of the North Sea.

Five years later, the company began installing well-head safety systems and from this

developed a valve which it believed was better than those it could buy from established manufacturers. Its first major customer in the North Sea was British Petroleum.

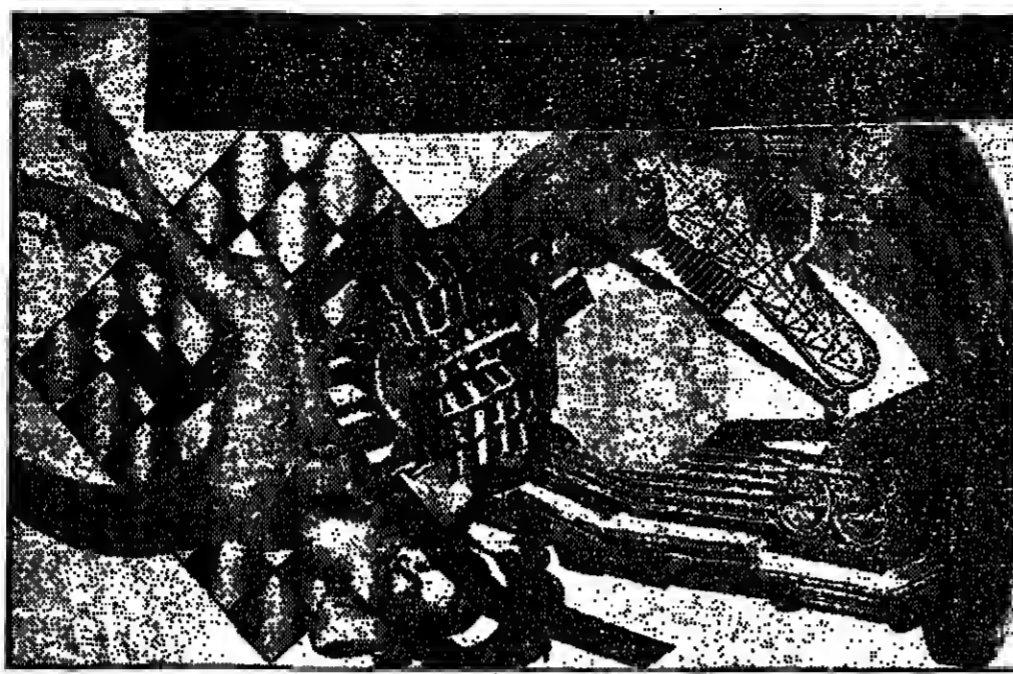
Well-head safety systems are very simple in principle, but often complex in practice because one oil platform may be connected to 50 well-heads.

On the platform itself is contained the reservoir oil tank which holds the hydraulic fluid for the pump which maintains the pressure in the control system and the complicated network of stainless steel pipes which are connected to ensure that all valves operate in the right order. They are, in effect, the logic control system for the system. The pressure in the hydraulic system holds the

THE ARTS

Museum of Modern Art, Oxford/William Packer
Pop across the years with Peter Phillips

The problems of reputation are as various as reputation itself, even so the domestic view of the expatriate is always rather a special case, and one unlikely to be eased by the passage of time.



Custom Painting, No 5 1965 by Peter Phillips

Rather he settled in Zurich, and though he has since shown widely enough abroad, here we have had one dealer's show in 17 years and only the occasional participation in prestige assemblies and reviews.

English to those of us who tasted it in its own time. As paintings they are curiously complete and definitive, the handling of the oil paint as straight-forwardly assured as the imagery is unequivocal.

But still, whatever his intentions might have been, the actual experience of his work was now stuck in a dangerously split and one dare say sterile condition. It had taken this comparatively late work perhaps to make the point, but it is one which holds good for all the central period in this particular career.

against a schematic, geometric ground: a free association that may have harked back to Leger's later compositional plays, but quite lacking anything of his studied posturing.

state of affairs. But the signs are that Phillips at last chose to move out of the corner he was in. That early work had none of this division to it, and now the latest work begins to bear certain decided similarities to it, all most encouraging.



Mike Grady and Gay Hamilton

Beyond Therapy/Latchmere
Rosalind Carne

Lonely hearts and randy psychiatrists are guaranteed to produce at least a couple of self-conscious titlers among a London audience. It would certainly be unduly optimistic to hope for anything more from this feeble comedy by Christopher Durang.

The Creation/Elizabeth Hall
Max Loppert

The "good week for Haydn-lovers in London" that I foretold on this page last week turned out to have had greater attractions on paper than in its actuality.

to the assembling of such instrumental forces and the use of the splendid Westminster Abbey Choir trebles in place of choral sopranos. But Christopher Hogwood, conducting, seems to have left the matter of The Creation there; certainly, from this limp and at times lifeless account of music normally springing at the listener's every sense, I am hard put to recall a single phrase the whole evening that gave an indication of proceeding from anything so vulgar as an interpretation.

The Death of Von Richthofen/Public Theater, New York
Frank Lipsius

Mel Brooks apparently started writing a musical called Springtime for Hitler and turned it into the film The Producers when he realised the musical had no chance of success.

Des McAnuff, writer, composer and director of The Death of Von Richthofen as Witnessed from Earth, has another Springtime for Hitler on his hands at the Public Theater. This First World War musical depicts Manfred Von Richthofen, the Red Baron German flying ace, deliberating on April 20, 1918 about his future after confirmation of his 80th kill in battle.



A scene from 'The Death of Von Richthofen as Witnessed from Earth'

Douglas W. Schmidt's set gives realistic dimensions to the stunner of a front-line bunker along with the painted ceilings in the French chateau. Platforms appear for the two sides to do their more flamboyant musical numbers and the production boasts extraordinary props, including a full-sized Fokker plane with everything but the wings.

Hermann Goering, played by Rob Guntton. The lacus-corporal in the field who inspires Von Richthofen's political ambitions is Adolph Hitler, played with courageous cunning by Mark Petrakis. Von Richthofen's death is obviously

Pina Bausch's first London season. Pina Bausch's Tanztheater from Wuppertal will present two productions at Sadler's Wells between September 14 and 25. This will be the first visit of the company to London and they bring 1980 and Kon-

London Contemporary Dance Theatre at Sadler's Wells

London Contemporary Dance Theatre will open its three week season at Sadler's Wells Theatre with two works by American choreographers: Explained by Paul Taylor and The Broad by Richard Kuch.

Paul Taylor's Esplanade has been taught to the company by Eileen Crockett, the first British dancer to study contemporary dance at the Graham Studio in 1963. It is danced to Bach's Concerto No. 2 in E major and Concerto in D for two violins.

ALBERT, Air-cond. 5 836 3874. CC 800 3272-3729. Season announced by Martin & Rose Ltd. Goodbye Mr Chips. To 12.

CHICHESTER FESTIVAL THEATRE. 0243 781312. Season announced by Martin & Rose Ltd. Goodbye Mr Chips. To 12.

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PALACE. 01-437 6824. CC. 437 6824. 437 6824. 437 6824. 437 6824.

SADLER'S WELLS THEATRE. 01-234 5111. Season announced by Martin & Rose Ltd. Goodbye Mr Chips. To 12.

APOLLO. 01-437 6824. CC. 437 6824. 437 6824. 437 6824. 437 6824.

F.T. CROSSWORD PUZZLE No. 4955

Crossword puzzle grid with clues. ACROSS: 1 Left in carriage and pair (6), 5 Wide step in the present era (4, 3), 9 Ploughed a mowed field (6), 10 I've turned to lemon squash, not a good sign (4, 4), 12 Gambling game permitted in the course of a journey (8), 13 They're made to measure (6), 15 Ping of revolvers? (4), 16 One who feels the heat for one who feels the cold (7), 20 Book covering part of N. Africa (7), 21 Labour staged a walk-out? (4), 25 Not many people with a dog will keep one indoors (8), 26 It may be put on disc (8), 28 Without it there would be total ignorance (8), 29 Chews a sort of nut (6), 30 A group of society women (8), 31 Get up smartly (8). DOWN: 3 Given the sack (6), 5 Decorate with flags? (4), 6 Getting cool and rude treatment, clubbed (8), 7 Band member with permit (6), 8 Man enters another order (6), 11 Rising damp in place for cooking (4-3), 14 Fall of rotter in law-suit (7), 17 Just the chap for transplanting trees (8), 18 The joys of French windows (8). The solution to last Saturday's prize puzzle will be published with names of winners next Saturday.

FINANCIAL TIMES

BRACKEN HOUSE, CANNON STREET, LONDON EC4A 4BF
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Monday August 23 1982

A chance for U.S. diplomacy

NOW that the bloodshed and the devastation in Beirut has ended and the first contingent of the Palestinians has left, the chance must be seized to make out of these episodes a turning point in the search for a solution to the Palestinian problem. This is not another hollow appeal for the unattainable; there are practical reasons why Washington should not now settle back into a mixture of relief and disillusionment, and why the Arab countries should not argue for violent retribution against Israel for what has happened in Lebanon.

Comprehensive

One danger is that the U.S. will be sidetracked by the inevitable wrangling over the withdrawal of Syria, of the PLO, of the Israeli army and of the peace-keeping forces from Lebanon. Certainly there is scope for many months of diplomacy over this problem. But it must be solved in parallel with a new initiative on the derelict and discredited search for a comprehensive settlement to the core problem in the region.

The moment is ripe inside the U.S. because a new Secretary of State will be dealing with public and political opinion made more malleable by Israel's siege of Beirut. Perceptions have been jarred by the toughness of the Israeli offensive and will be more receptive to the reworking of the Camp David approach which is needed to win it a broader spectrum of Arab support.

In the region itself the U.S. will do well to build upon the related success of Mr Philip Habib's mediation, on his ability to persuade a range of Arab states to accept the dispersed PLO, and on the marked capacity of the U.S. to influence events and the incapacity of the Soviet Union to do anything to lessen the humiliation inflicted on the Arab cause.

Inaction could well prove costly to U.S. interests. Arab humiliation has led to a re-followed by Arab backlash and instability in Arab states; the Egyptian revolution of 1982 and the Israeli victory in 1982 is a case in point. The com-

Divide

There remains a great divide between Israel's minimalist interpretation of the Palestinian autonomy described in the Camp David agreement, and the Palestinian state demanded by Arab nations still wary of admitting that Israel has a right to survive at all. A completely fresh initiative by the U.S., and a peace offensive by the Arabs, might begin to bridge that gap and create an offer which Israel would find hard to reject.

Dumb insolence on the shopfloor

GENERALISATION ON industrial relations which take Fleet Street as their instance are more than usually prone to error. This is especially the case when our instance—the 24-hour strike by Fleet Street electricians two weeks ago—still awaits a decision by the electricians' branch on whether or not they will pay the small fine and large costs arising from the action taken by the Newspaper Publishers Association against Mr Sean Geraghty, the branch's secretary.

Militancy

The electricians went to court and fought the action; the logic of that initial recognition of the court's competence in the matter should lead them to pay its penalty. That is notable, given: (a) the militancy of the branch, one of the few far left pockets within the Electrical and Plumbing Trades Union; (b) the traditional readiness of print unions to take a strong stand; and (c) the apparent eagerness of many in the TUC—especially the printers—to produce a martyr for the cause of Tebbit-hashing.

It can be argued that if such a union branch in such an industry is willing to recognise the competence of the court over a morally emotive issue such as a sympathy strike for health service workers, the legislation—Mr Prior's 1980 Act, of course, not Mr Tebbitt's Bill—has already bedded down. It can also be argued that the use of the normal courts—in this case just down the road from Fleet Street—is clearly a much better tactic than the elaboration of a new instrument such as the Industrial Relations Court introduced by Mr Heath in 1971.

But that is all which can be argued with any confidence. The Prior Act, which was concerned above all the secondary (including sympathetic) action has not deterred many thousands of miners, workers, public service workers and others from taking limited action in support of the health service workers, and it has not encouraged any employers other than the NPA to do anything about it.

It is perfectly true to say that the sympathy has been of a limited kind—a day here for one group, a half day or a lunch-time picket for another. Still, a day's pay loss is £20 or £30 out of a family budget; in some cases as much as the civil service—it could also mean disciplining

Challenge

The fact that it is fear of the dole rather than respect for the law which constrains the unions is an important difference, even if it produces, in the short run, the same result. For when the economy picks up, or when the fear is replaced with active resentment, the law may be exposed to a challenge more fierce than any seen in this country since the war—including the events of 1972 and 1974.

The unions have lost almost every battle with employers and the Government since 1979; their militancy has largely been rhetorical and overblown; their campaigns have amounted to little. But employers and Government cannot assume that these lost battles mark a final retreat of union power. The unions' collective strength, though latent, is still the greatest in civil society. The bedding down of what now seems likely to be only the first third of the Government's employment legislation of this parliament does not mean it has put down roots strong enough to withstand a storm, if and when it blows.

THE U.S. ECONOMY

A taxing victory for Reagan

By Reginald Dale, U.S. Editor, in Washington

"THE MOST rewarding week we've had." That was President Ronald Reagan's verdict on the past seven days as he left at the week-end for a delayed two-week holiday at his Californian ranch, "flying high," in the words of one of his senior aides.

With some favourable economic news at last and a record Wall Street rally—not to mention the start to the PLO evacuation from Beirut and a deal with China on Taiwan—Mr Reagan clearly had cause for satisfaction. Most gratifying of all, though, was Thursday night's dramatic Congressional vote in favour of his \$88.3bn three-year tax bill, giving him an unbroken string of budget victories and a dazzling reassertion of his powers of political persuasion.

If there was a fly in the ointment, it was the knowledge that 89 Republicans in the House of Representatives had voted against his bill in the most serious right-wing rebellion of his administration. The White House is hoping that the two-week Labour Day recess will allow passions to cool. But the fact remains that Mr Reagan won his victory at the expense of opening up a gaping rift in the Republican Party over fundamental issues of economic policy.

The economic conservatives who until only a month or so ago were his staunchest supporters are feeling bitter and betrayed. Pure supply-siders like Congressman Jack Kemp of New York argue that the bill represents a "dramatic U-turn"—if not the total and shameless abandonment of the whole tax-cutting theory of Reaganomics and the way it has been practised over the past 20 months.

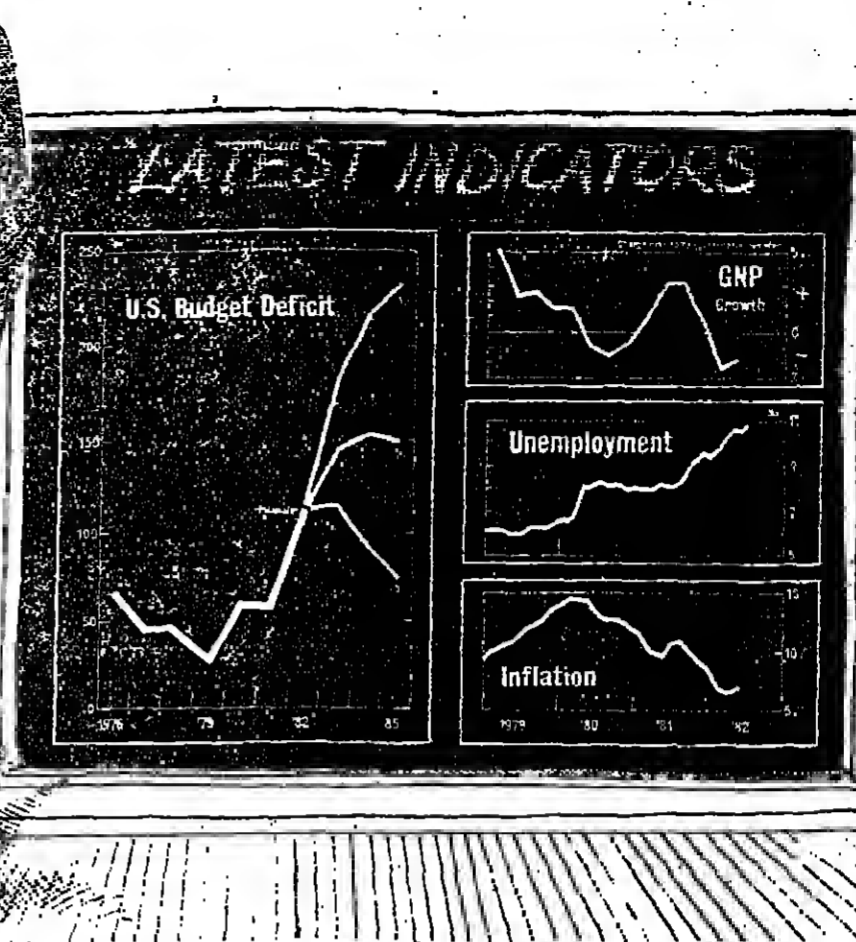
Mr Reagan has spent most of the past three weeks insisting—to individual congressmen, local audiences and finally the nation—that this is just "plain hogwash." Indeed, he refuses even to call his revenue-raising measure a tax increase. Rather, he says, it is a tax reform, largely designed to correct unfairness in the present system. Even with its passage, he maintains, Americans will still benefit from the largest tax cut in history—to the tune of \$355bn over three years. Above all, he has been drumming out the message that the bill represents absolutely no change in the overall philosophy and policy on which he was elected.

The bill is simply a refinement of the vast three-year tax-cutting programme initiated last summer. Mr Reagan agrees—almost as if it would have been necessary all along. However, he admits that action to raise revenue had become essential to reduce budget deficits, so as to bring down interest rates and unemployment and spur economic recovery.

Yet this is the same smiling Ronald Reagan who only last January was solemnly proclaiming in his State of the Union message that higher taxes did not mean lower budget deficits—they simply encouraged higher government spending



Budget deficit forecasts: (1) estimate in June budget resolution assuming no corrective action taken; (2) estimate by independent Congressional Budget Office, assuming Reagan tax and spending programme implemented; (3) Administration's official forecast, assuming Reagan programme implemented.



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and less private investment. He did not want, he said then, to "balance the budget on the backs of the American people." His existing policies of tax and spending cuts would reduce the deficit and, in time, eliminate it altogether. Mr Kemp and his fellow supply-siders acclaimed that speech with as much vigour as they are now castigating the tax bill.

What worries them is the abandonment of one of the most sacred principles of Reaganomics and the precedent it may have set for the future. They say that however the bill is described, it still takes almost \$100bn out of the private economy at an extremely delicate economic and political stage.

To an extent, Mr Reagan himself led the call out of the haze. He admitted publicly that he had to "swallow hard" before signing the bill his backing, and initially had no intention of mounting a major personal campaign for what he himself acknowledged to be an unpopular measure in an election year. It was only when it became clear that the bill was heading for a massive defeat, possibly by as much as two to one in the House of Representatives, that he reluctantly took to the saddle.

His decision to do so was one of the blaguest political risks he has taken so far. By committing his prestige and that of his office to the battle, he ensured that failure would have raised serious questions over his political authority.

The winning over of individual congressmen, one by one, proved far more difficult than in the heady days of last summer, when he scored his first spectacular congressional budget victories. In the end, a quite different coalition emerged.

Last year, with the Republican party united behind him, he narrowly outed the incentive of the tax cuts. This time, with the unusual support of

Management and Budget (OMB) was assuming an increase in Gross National Product in 1982 of 3.4 per cent. This year it puts the same figure at -0.7 per cent.

Average unemployment for 1982 was forecast as 7.0 per cent. It is currently at a post-war record of 9.5 per cent, with the expectation of an average 9.2 per cent for the year. Last year, interest rates of 91-day treasury bills were projected at an average of 10.5 per cent for 1982. This year the same figure appears as 12.0 per cent.

On the inflation front the news is better. Last year's forecast of a 7.0 per cent year on year increase in the consumer price index in 1982 has been trimmed back to 5.9 per cent reflecting the administration's main economic success story so far.

But the most remarkable contrast of all is in the two budget deficit forecasts. In July last year the OMB estimated the fiscal 1982 deficit at \$42.5bn, a figure the administration admitted at the time to be higher than it wanted. The same figure this year is \$168.9bn, rising to \$115bn in 1983—figures that even government officials admit to be unrealistically low.

Scepticism over its budget deficit estimates has plagued the administration in the past year. It has been the cause of much of Wall Street's lack of confidence in applied Reaganomics. It remains to be seen whether any scepticism will be dispelled by the tax bill's passage. The

in July 1981, the Office of

The administration has been plagued by scepticism over its budget deficit estimates

mainstream Democrats and the Democratic House leadership, he had to entice a much larger number of his own dissenting Republicans into the fold.

If there was a dominant theme it was the need to rise above party allegiance and economic preconceptions "for the sake of America." For the Democratic leadership, this was a relatively easy task given that the opportunity to argue that Reaganomics had failed and that the Democratic party was rallying to the support of a bill that would remove some of its worst excesses.

It was not a hard case to make. Just over a year ago when the foundations of Reaganomics

ducing the weight of government deficits and interest rates brought down, and the money somehow found for the biggest defence build-up in American peacetime history. With the foundations of the new programme laid, a new wave of confidence would sweep through Wall Street and the business community.

Reality, of course, has been cruelly different. It is enough to take a look at the administration's official economic assumptions in the July 1981 mid-session budget review, and compare them with this July's, to see how far things have gone wrong.

Jersey and Guernsey will be fielding a strong team—their two Balliffs, Sir Frank Ereaut and Charles Frossard respectively—at the Home Office this week to argue that Britain's freedom of the skies policy does not suit the Channel Islands.

The islands complain that the Civil Aviation Authority has been granting licences for charter flights which the islands have made perfectly clear they do not want. They have a recurring nightmare of ending up with a Major-General situation where you can virtually only travel there on a package tour. Not a fitting transport system for the well-heeled bankers who set in and out of the Channel Islands.

With the rising cost of air travel the islands have relaxed their opposition to any charter operations whatsoever. But they are still firmly opposed to charter commitments for the scheduled airlines on the islands' "lifeline" routes from Heathrow, Gatwick and Southampton.

The islands authorities regarded it as the last straw when, earlier this year, the CAA gave British Airways permission to run a series of charter flights to Jersey.

The charters did not finally materialise. But the islands regarded Trade Secretary John Riffe's refusal to intervene as an ominous sign.

Now they feel it is an inopportune time to allow air traffic to be decided over their heads from London. They want more "say" about who flies to their favoured archipelago.

Among the leather wallets advertised by a New York store are: walec buffalo, chino, whale, sea turtle — and antique executive.

Men & Matters

Forge politics

Sheffield steelmen were not, on the whole surprised when Dr Donald Harwick, the strong man of the city's private steel sector, emerged as chairman designate of Sheffield Forgemasters, the new public sector-private sector company that has risen from the Phoenix Three negotiations with British Steel.

But what has raised Yorkshire eyebrows is that Harwick is to be a part-time chairman of the new venture which is regarded as so crucial to future relations between the two sectors of British steelmaking. He will also continue in his job as chairman of the thinned-down but still viable, Johnson & Firth Brown steel division.

Hardwick moved into the steel spotlight ten years ago as managing director of Firth Brown, one of the two companies making up the new Sheffield Forgemasters. He has a distinguished record as a metallurgist and of late has shown equal skill in manipulating the tangled strands of politics that surround the steel industry. He served a long-tenure as president of the British Independent Steel Producers Association, stepping in to take over from his old Sheffield rival Peter Edwards when Hadfield's went into the Lonrho group and the latter's base disappeared overnight.

Bank draughts

The refusal of the Isle of Man Government to hold a public inquiry into the collapse of the Savings and Investment Bank (SIB), the island's biggest independent bank, has not gone down too well in the island. Many Manxmen believe that heads should roll as a result of the embarrassing bank failure.

Bill Dawson, the island's Treasury for the past three years, has been in the firing line because it was his department which was responsible for supervising SIB and should have been aware of the problems at a stage when a rescue could have been mounted.

But Dawson is a civil servant. There is a growing feeling on the island that the problem lies with his political masters who seemed unprepared to commit enough money to pay for a high-powered bank examiner until it was too late. Applications for the £25,000 a year post now about to be created do not have to be in until the end of this month.

... and air ways

Jersey and Guernsey will be fielding a strong team—their two Balliffs, Sir Frank Ereaut and Charles Frossard respectively—at the Home Office this week to argue that Britain's freedom of the skies policy does not suit the Channel Islands.

Traditionally the islands have relied heavily upon year-round services provided by scheduled carriers.

The charters did not finally materialise. But the islands regarded Trade Secretary John Riffe's refusal to intervene as an ominous sign. Now they feel it is an inopportune time to allow air traffic to be decided over their heads from London. They want more "say" about who flies to their favoured archipelago.

MALAYSIA MINING CORPORATION BERHAD

(Incorporated in Malaysia)

ANNOUNCEMENT TO SHAREHOLDERS

For the second tin export control period from 1st July to 30th September, 1982 your company and its wholly-owned subsidiaries have been allocated the following quotas:

Company	Quota of Tin Concentrates (Tonnes)	% of Estimated Normal Production
Malaysia Mining Corporation Berhad	360.54	53.8
Bidor Malaya Tin Sdn Berhad	165.12	53.2
Lower Perak Tin Dredging Berhad	32.71	24.7
Southern Kinta Consolidated (M) Berhad	196.62	70.8
Southern Malayan Tin Dredging (M) Berhad	273.03	49.5
	1028.02	

In view of the severity of the cutback and the impact of low tin prices, the group's production policy has been re-examined to maximise cashflows and profits whilst minimising hardship to the employees on the various mines.

In the light of these constraints, it has been decided to close down the following dredges temporarily with effect from the dates indicated until such time as there is a significant improvement in the situation.

Company	Section/Dredge	Shutdown
Malaysia Mining Corporation Berhad	Kampong Gajah Section	
Bidor Malaya Tin Sdn Berhad	No. 4 Dredge	August 17, 1982
	No. 2 Dredge	August 16, 1982
	No. 3 Dredge	August 17, 1982
Lower Perak Tin Dredging Berhad	No. 1 Dredge	August 17, 1982
Southern Kinta Consolidated (M) Berhad	Bersam Section	
	No. 1 Dredge	August 17, 1982
	5. Kampar Section	August 17, 1982
Southern Malayan Tin Dredging (M) Berhad	Tanjong Tuang Section	
	No. 5 Dredge	August 18, 1982

Apart from Southern Malayan's No. 2 dredge which was closed down on July 29, 1982, due to unprofitable operations, the remaining dredges in the group will continue in production and no retrenchment of workers is envisaged at this stage.

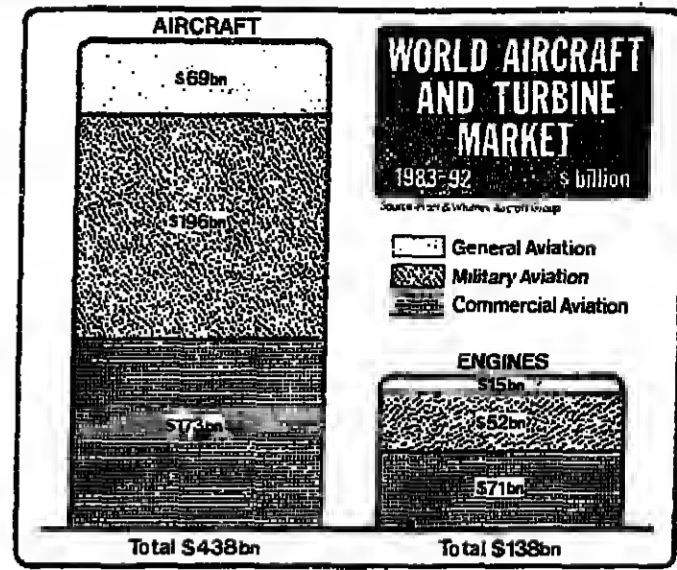
On behalf of the board
Abdul Rahim Aki
Director

Kuala Lumpur
August 23, 1982

مكازم النحل

Aerospace

Western world aerospace activity has suffered from the recession, especially on the civil side. The outlook, however, is for over \$600bn of business through the next decade for commercial and military aircraft and engines, missiles, spacecraft, avionics and equipment of all kinds



An artist's impression of how the civil version of the projected new joint Anglo-Italian (Westland and Agusta) EH-101 heavy helicopter will look. The aircraft is being designed and built as a military replacement for the Sea King anti-submarine warfare helicopter, but the commercial version will be built alongside it to spread the costs and widen the ultimate market.

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Editorial production in this survey is by Mike Wiltshire and Joe Hutton.

Industry resilient despite setbacks

By MICHAEL DONNE
Aerospace Correspondent

THE WESTERN world's aerospace industries go to this year's Farnborough Air Show (September 5-12) confident that despite the severe ravages of the recession, especially in the civil market, the longer term outlook for their products remains good provided they can survive their current problems.

The array of civil and military aircraft, engines, guided weapons and electronics and other equipment of all kinds that will be on display at Farnborough will indicate an industry that is resilient, innovative and forward-looking despite the serious setbacks of the past two to three years as a result of world economic difficulties.

The latter have been most severe on the civil side of the industry. The heavy losses incurred by the world's airlines as a result of the decline in air travel and soaring costs have in turn led to a marked fall in the inflow of new orders and in some cases even to cancellations or deferrals of orders for new-generation equipment placed as recently as two to three years ago.

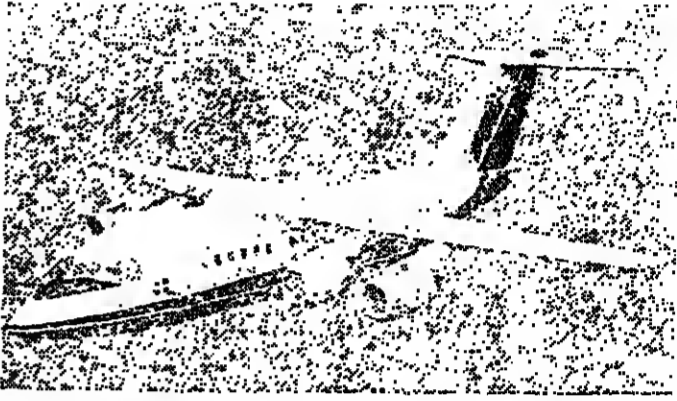
One immediate result of this has been that most commercial aircraft and engine manufacturers have been obliged to run down their production rates

national, as opposed to nuclear, weapons in the Western Alliance and a continued high level of interest in military aircraft and their associated weapons and equipment in the countries of the Third World are both tending to ensure a steady inflow of new military aircraft orders, although competition is exceptionally fierce.

New military aircraft programmes now coming to fruition include the 400 aircraft in the AV-8B Harrier II programme for the U.S. Marine Corps (336) and the RAF (60) with four development aircraft; the new JAS multi-role combat aircraft for the Swedish Air Force; the B-1E strategic bomber in the U.S.; and the 'next generation trainer' for the U.S. Air Force, recently won by Fairchild and Garrett in the U.S.

On the way are such prospective new ventures as the P-110 fighter in the UK, which may well become a collaborative venture with West Germany and the new Anglo-Italian EH-101 helicopter; a new trainer for the U.S. Navy, with the British Aerospace Hawk now the most likely ultimate winner; and in the longer term the likelihood of some kind of supersonic vertical take-off fighter for the mid to late-1990s.

New engines, such as the development of the Turbo-Union RB-199 for the P-110 fighter, and perhaps also a Viper engine replacement; major new missile programmes, such as the British Aerospace Sea Eagle long-range air-to-surface anti-ship missile, and the Advanced Short Range Air to Air Missile (ASRAAM) are on the way.



The British Aerospace BAe 146 four-engine regional airliner is now undergoing its flight test programme. The aircraft, which involves an investment of over £250m by British Aerospace, is being built in two versions—the Series 100, carrying about 80 passengers, and the larger Series 200, carrying up to 109. The test programme is aimed at winning a Certificate of Airworthiness by the end of this year, clearing the way for deliveries to customers in early 1983.

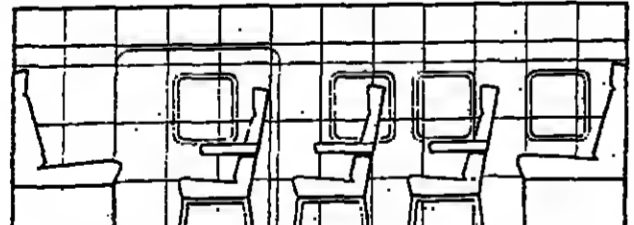
substantially better times over the past decade despite today's difficulties. Boeing, for example, the biggest jet airliner builder in the world, still believes that there will be a demand for something around \$126bn of new jet airliners between now and 1992, covering just over 4,000 aircraft.

Pratt and Whitney, the world's largest aero-engine manufacturer, is also optimistic. This company forecasts a total civil and military aircraft and engine market between 1983 and 1992 of about \$438bn (in 1982-\$3 dollars).

Of this, about \$173bn will be for some 4,050 commercial airliners, creating a demand for some 12,000 turbine engines, worth about \$71bn. In the military market there

When we designed the new Westland 30, we wanted to build a helicopter that was so versatile it would meet your needs, whatever field you're working in. We succeeded.

The secret of our success is the 460 cu. ft. of space inside. Because it gives you the freedom to choose from a wide variety of cabin layouts.



Suppose, for instance, that like British Airways Helicopters, you wanted to carry commuters on a scheduled passenger service.

All we would need to do is to fit the Westland 30 with our standard seating plan. That way you could carry seventeen people in armchair comfort.

There's so much room, they can even stand up and move around.

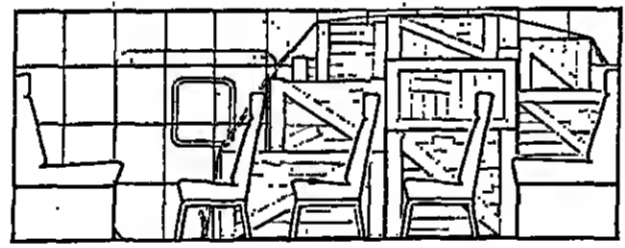
And that's a rare luxury in a helicopter. We have also built 74 cu. ft. of luggage space into the back, so they won't keep tripping over their cases.

In fact, they'll feel so comfortable they could be forgiven for thinking they were travelling in a 737.

That takes care of commuter transport. But what about offshore support?

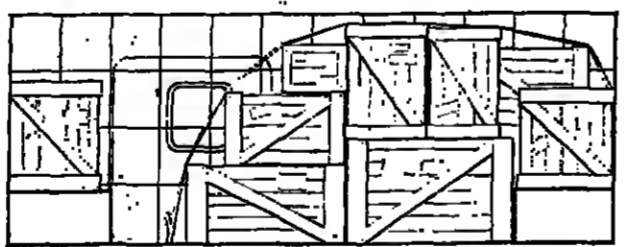
After all, you might well need to ferry oilmen to and fro over the North Sea.

In which case, we can offer you a variety of options.



One of the strengths of the Westland 30 is its rapid turn-round facility. That is to say you can detach the seats and fill the cabin with anything from frozen peas to spare parts.

All in the space of five minutes. No other medium-capacity helicopter can give you such flexibility.



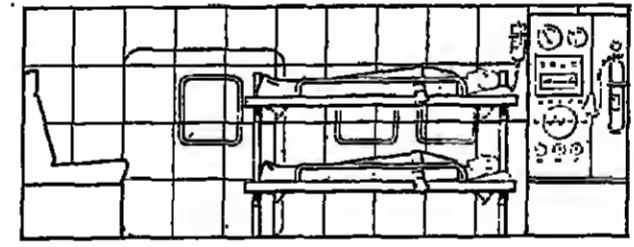
If, on the other hand, you're operating freight services, you will find the new Westland 30 takes a good deal of weight off your shoulders.

Using the series of anchor-points in the floor, you can secure and transport almost any kind of cargo.

Running an emergency service like the Red Cross is a different matter. Say, for example, you wanted to fly earthquake victims from the scene of a disaster to a medical centre.

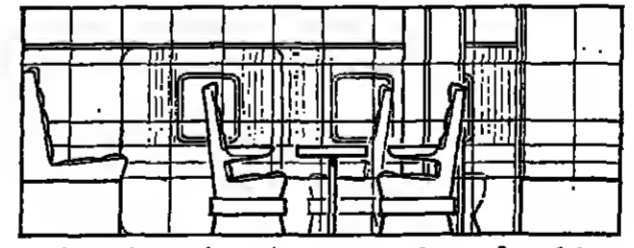
There too, the Westland 30's

spacious cabin will come to your rescue. It holds 6 standard hospital stretcher cases and up to 8 seated casualties with no trouble at all.



And it's so tough and adaptable inside it can work equally effectively for police, fire and ambulance services.

But the priorities would differ again with a multi-national company like Ford.



It might then be a question of rushing top executives to meetings in places like

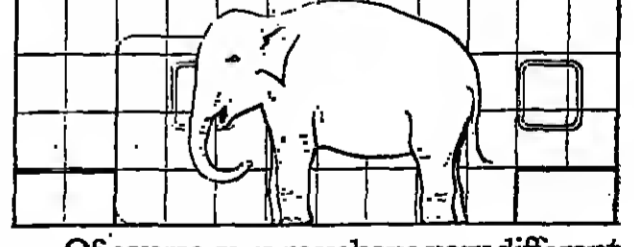
London, Paris and Brussels in the style they're accustomed to.

We've already catered for that. We've designed a luxurious VIP cabin layout for six to ten people.

It can come complete with a galley, a toilet, communication systems and air-conditioning.

There are optional extras such as a cocktail cabinet and swivel armchairs.

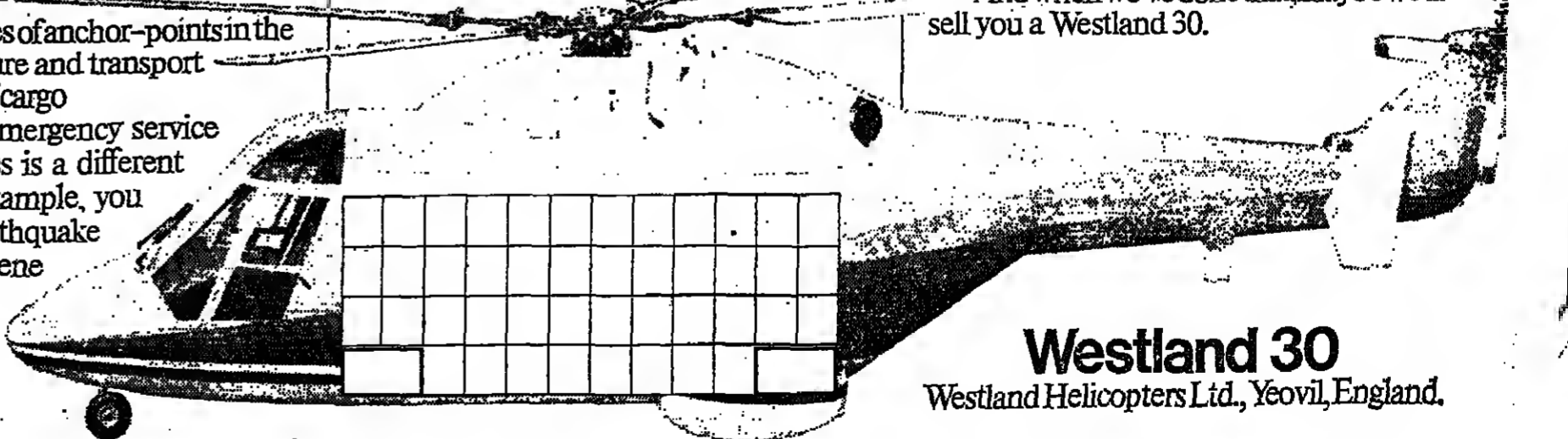
We can even fit a separate private compartment, should you require it.



Of course, you may have very different ideas about what you want to use the Westland 30 for.

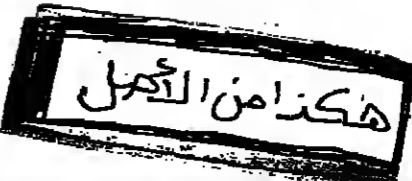
If so, why not get in touch with us? We'll be only too happy to design a cabin layout specially for you.

And when we've done that, maybe we'll sell you a Westland 30.



Westland 30
Westland Helicopters Ltd., Yeovil, England.

WE WON'T SELL YOU A WESTLAND 30 UNTIL YOU TELL US WHAT TO DO WITH IT.



Like most wars, on whatever scale, the Falklands conflict provided a practical testing ground for much military technology still in the development stage. Our Science Editor, David Fishlock, here describes some of the valuable information flowing back to Britain's Royal Aircraft Establishment at Farnborough

Research centre grapples with testing demand

THE Royal Aircraft Establishment, Farnborough, host to the Air Show, is Britain's biggest defence research and development centre and the linchpin in the system of technical advice supporting the Ministry of Defence's £2.6bn procurement programme for air equipment in 1982-83. It also supports Britain's civil aerospace activities, from new airliners to satellite systems such as UK participation in the European Space Agency's planned earth-resources satellite, ERS-1.

The air systems establishment has experienced two traumatic developments since the last show. One was the return of Mr Tom Kerr for his third tour of duty, this time as director, with a mission to implement

major changes required both by the Strathcona report on defence R and D, and by the changing perceptions of weapons R and D. The other was the Falklands war, in which numerous RAE developments nearing completion found themselves abruptly tested in battle.

Tom Kerr, 58, is a physicist and former RAF fighter pilot and flying instructor whose previous experience at Farnborough includes leading the supersonic flight testing programme in the 1950s and as head of the research group in weapons department in 1970. Before his latest return he was director of the National Gas Turbine Establishment, Fyestock.

Mr Kerr's new job included

cutting the RAE's payroll by 25 per cent over four years and, simultaneously, adapting the establishment to a major R and D policy change, putting less emphasis on aircraft themselves and more on weapons and their delivery systems.

The Strathcona report called for much project work as well as laboratory services provided by the defence R and D establishments to be done instead by industry under contract. Air equipment R and D was less vulnerable to this instruction than army and navy equipment R and D, where traditionally more design and project work had been done in-house. Nevertheless, for the RAE it will mean some changes.

For example, there is the possibility of opening up the Farnborough airfield to business aviation but with the Establishment continuing to control and operate it for experimental flying.

The more positive side of Strathcona includes the strengthening of long-term basic research. So far Kerr has raised it by 2.5 per cent of his budget and hopes to double the proportion this year so as to achieve the recommended 5 per cent level.

To meet demands for staff economies two RAE departments—engineering physics and flight structures—have been abandoned. Work has either been picked up by industry or transferred to other departments. Flight systems, for example, has taken responsibility for the complete cockpit structure, human factors and survival systems, in a major UK effort to redesign the cockpit.

Kerr has also created three new divisions. One, in the flight systems department, will focus the rapidly developing technologies of flight computers. Another is an unmanned aircraft division, emphasising the growing potential of the remote pilotless vehicle (RPV). A third is a systems analysis division, reflecting his experiences of the value of simulating war scenarios at the Defence Operational Analysis Establishment in the 1960s.

Not yet resolved is the future of the National Gas Turbine Establishment near Farnborough. Strathcona recommended a special study of the future of this laboratory and whether, for example, its programme could satisfactorily be divided between RAE and Rolls-Royce. About one-third of the NGTE's work is on civil aircraft engines. On future military aircraft concepts such as the P110 fighter and the super-sonic jumpjet, RAE and NGTE already work in close partnership. A merger between RAE and the NGTE is an obvious possibility.

"My job is totally different from that of Farnborough's director 10-15 years ago," Mr Kerr acknowledges. But it still leaves him time to get immersed in the science and technology of aerospace, while on the weapons side he is increasing, not reducing, the establishment's efforts.

One major change on the civil side which has given him some extra manpower is the closure last spring of the thermal testing of a Concorde airframe, a programme which involved about 66 people. Cold testing continues for several years yet, however, to complete the data needed for Concorde to continue in service to the end of the century.

The other recent development, the Falklands war, drained the laboratories of much of their most advanced technology as the special demands of the engagement

became clear. Often the services learned how to use the new technology while journeying to the Falklands.

During the engagement the RAE carried out about 80 trials on its ranges in direct response to such requests as how ships could decoy the air-launched Exocet missile. It was an extremely stimulating time for the establishment—"people had the most innovative ideas," Mr Kerr says.

Wind-tunnels

Tasks thrust upon Farnborough as a result of the engagement ranged from new combinations of aircraft and weapons—Harriers armed with the Sidewinder missiles, for instance—to the use of its wind-tunnels to explore ways of putting up tents in high winds.

The establishment's capability for night vision was in urgent demand in a war which was being fought round the clock; traditionally night has meant a respite in fighting. New navigation and radio fix systems were rushed from the laboratories to equip the Vulcans and Nimrods for in-flight refuelling in total darkness. The Harriers and helicopters were hastily fitted with the latest technology for night vision.

"The rate at which we introduced modern systems at the start of the Falklands crisis is incredible," Mr Kerr claims. "Some of the new systems will be making their public debut at the Air Show. Farnborough itself will be demonstrating its REDOWL (Remote Eyes in the Dark Operating Without Light) system of night vision for helicopter pilots as part of a major exhibit of the helicopter as a weapons system. REDOWL allows the pilot to fly very low and to undertake search and rescue operations at light levels lower than clear starlight. Ferranti developed the technology in collaboration with the RAE's flight systems department.

REDOWL's display is mounted on the helmet of the pilot and served by a low-light-level TV or infra-red sensor set forward on the nose of the helicopter (see accompanying

sketches). The novelty of the RAE's system is in the way this sensor follows the head movement of the pilot, providing him with an interrupted wide-angle vision of the world outside. He can even effectively see "through the floor," for his field of vision extends 100 degrees to the left and right of centre, and from +20 to -100 degrees in the vertical plane.

The helmet-mounted display measures pilot head angles in pitch and yaw and feeds the figures to servos in the sensor platform so that it follows the pilot's line-of-sight. At its heart is a very fast-acting servo, found essential in order to avoid the pilot becoming severely disoriented by any lag in the response of his electronic eye in following the direction in which he was actually looking. If they were to retain the pilot's full cooperation the scientists found that the sensor had to swivel at speeds of at least 1,000 degrees per second.

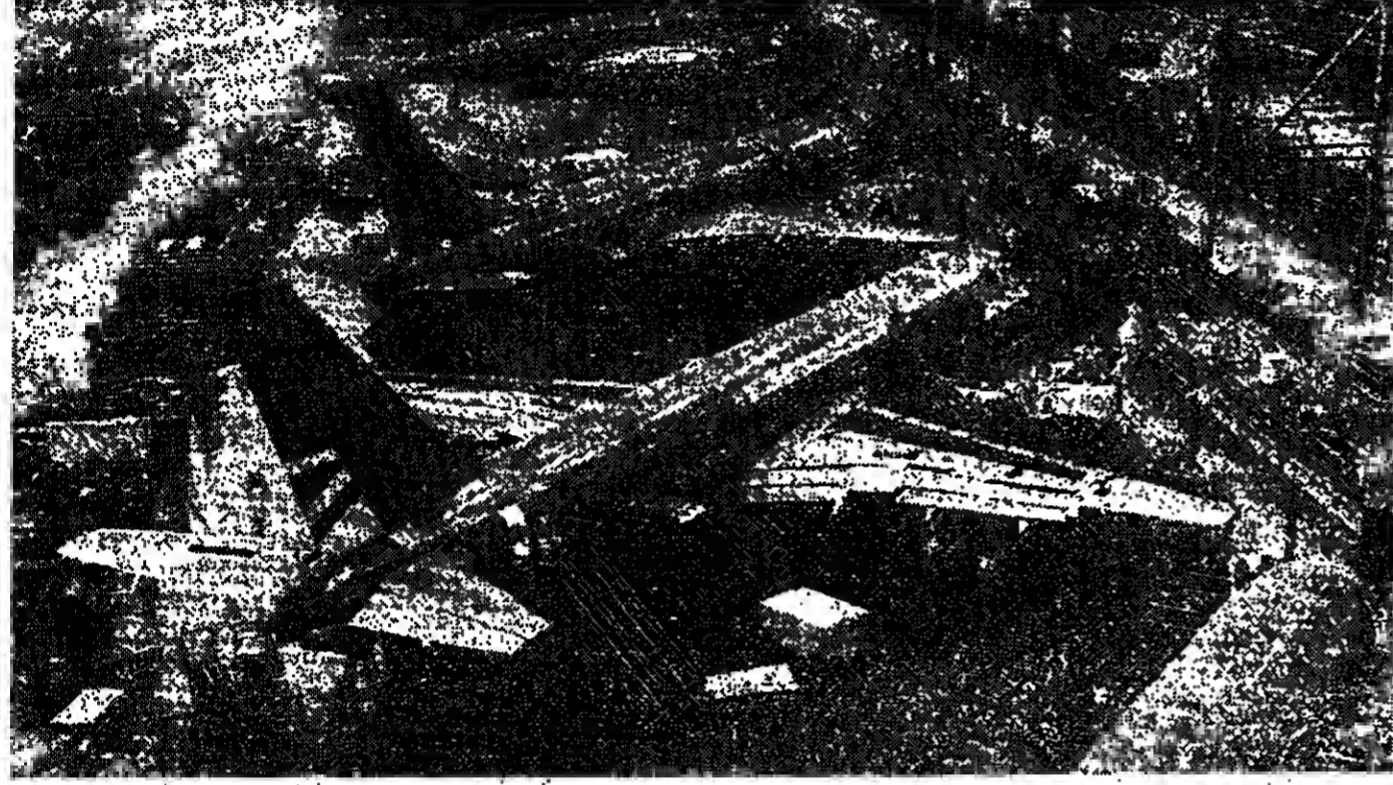
Aerospace enters a new era

THE FINANCIAL TIMES, in conjunction with the Royal Aeronautical Society, is holding the latest in its series of Aerospace Conferences on August 31, and September 1 and 2, at Grosvenor House, Park Lane, London, entitled "Aerospace Enters A New Era."

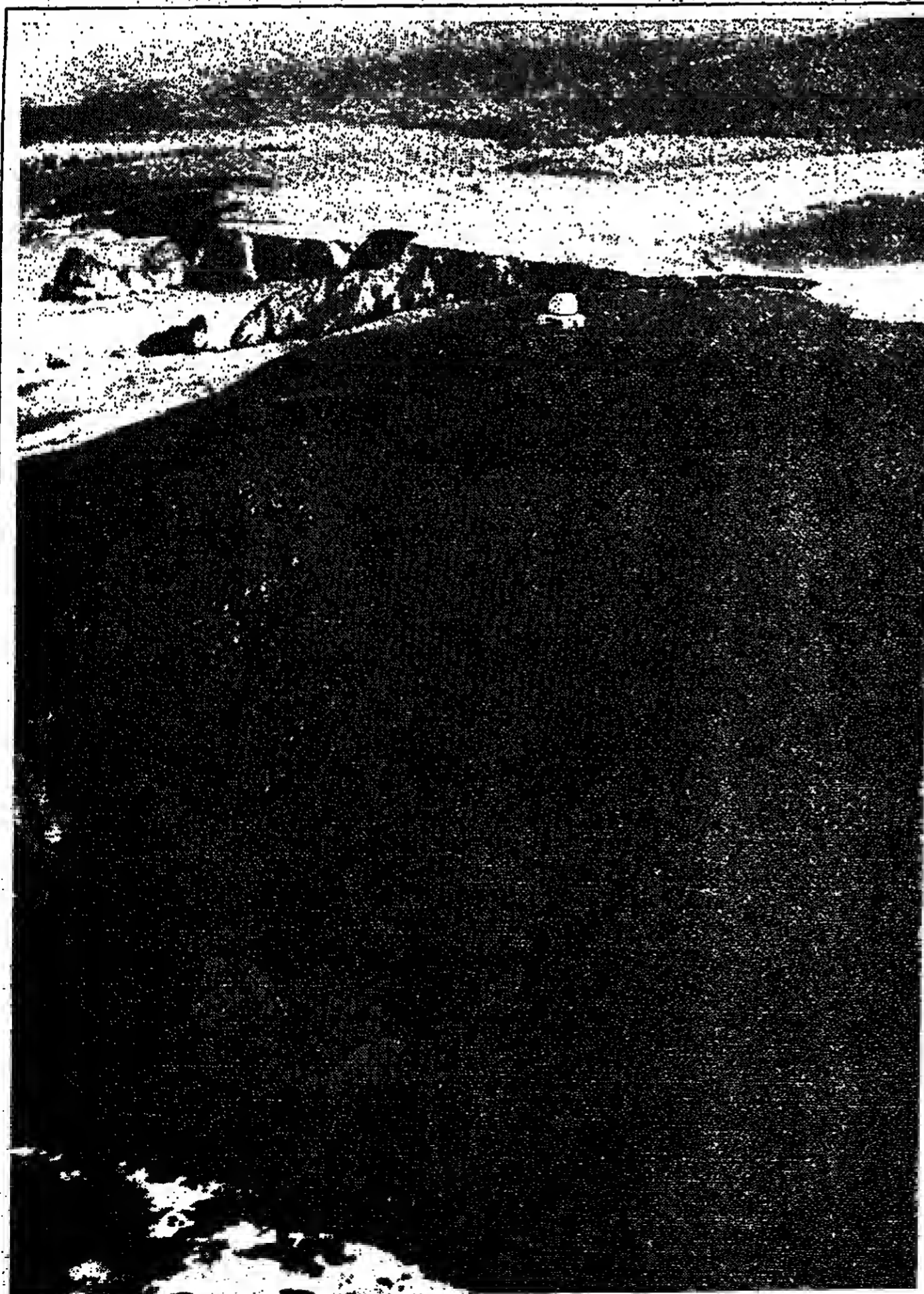
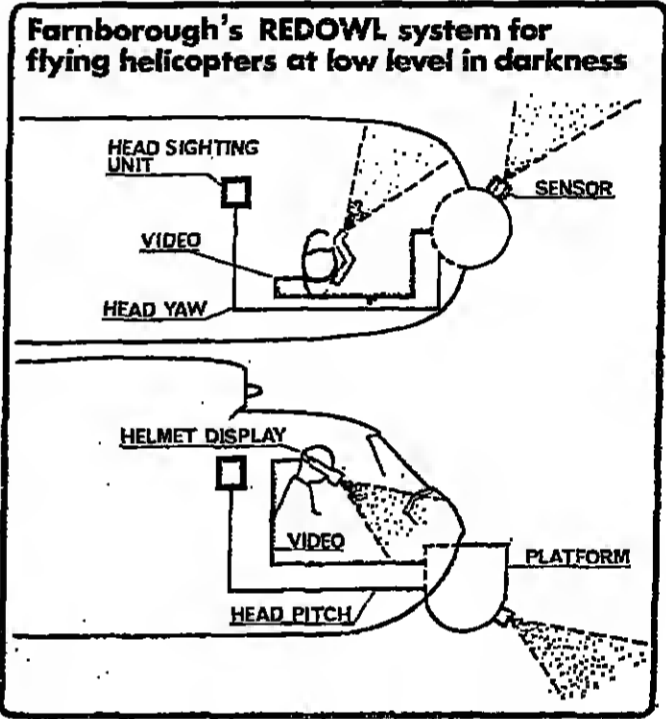
Designed with the Farnborough Air Show (September 8-12) in mind, the theme of the conference is that, despite the current recession, there is considerable hope for the future. A distinguished international panel of over 30 leaders of the aerospace, civil aviation and related industries will discuss this theme during the three-day event.



Mr Tom Kerr—back at RAE as head man on his third tour of duty



The first of 17 twin-jet 757s for British Airways (BA) takes final shape at Boeing's Renton, Washington, factory. The new aircraft will join the 757 test fleet later this year for Britain's Civil Aviation Authority certification. UK Government approval is expected in January, when the first BA 757 is scheduled for delivery



New electronic bird watcher scans North Sea air traffic.

Who would expect air traffic to be much of a problem anywhere near this lonely headland in the Shetland Islands, far to the north of Scotland?

The reason is simple. Oil. The Shetlands, once better known for sweaters and sheep-dogs, are just a hop by helicopter from North Sea oil fields. It's not surprising, then, to find a sophisticated radar system in use keeping busy whirlybird air traffic safely under control.

Inside the cocoon-like shelter shown in the photo (left) is the antenna of such a system, designed and built by Cossor Electronics Limited for the U. K. Civil Aviation Authority. At the airport nearby, controllers use Cossor displays to monitor approaching and departing air traffic.

This is just one of hundreds of similar radar systems that Cossor, a Raytheon company, has

supplied for use at airports around the world—and just one part of Raytheon's widespread involvement in air traffic control.

Raytheon has recently completed a fully integrated air traffic control system for the Federal Republic of Germany. In the United States, we have long been a supplier of radars, automated displays, and computer systems for the enroute air traffic control network.

Raytheon... a \$5.6 billion company in electronics, aviation, appliances, energy, construction, and publishing. For copies of our latest financial reports, please contact any of the offices or companies listed below, or write: Raytheon Europe, 52, Route des Acacias, 1277 Geneva, Switzerland, or worldwide headquarters, Raytheon Company, 141 Spring Street, Lexington, Massachusetts, U.S.A. 02173.



FOR INFORMATION ON COSSOR: Cossor Electronics Limited, The Pinnacles, Elizabeth Way, Harlow, Essex CM19 5BB, England. Tel. 0279/26862.

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AEROSPACE IV

The engine makers and suppliers are having their troubles but technological research for the long term continues apace.

Tougher times ahead for engine makers

AS WITH the aircraft builders, the world's major aero-engine manufacturers over the past year or so have experienced the full weight of the recession. The marked slow-down in the rate of ordering by the airlines has forced production cuts on the engine builders, and in some cases, such as Rolls-Royce, the reduced work-load on civil engines such as the RB-211 has led to reductions in the labour force.

The lack of orders for the Boeing 747, and the decision by Lockheed to end TriStar production by 1984, resulting in the cancellation by some airlines of outstanding options on the latter aircraft, have helped to depress demand for the Dash 534 version of the RB-211.

In the meantime, however, production work on the new Dash 535 version of the RB-211 engine is growing, to meet existing contractual commitments, but the slow inflow of new orders for the Boeing 757, which the RB-211-535 powers, is also helping to keep overall commercial aero-engine output at Rolls-Royce at a comparatively low level.

Slackening

Similarly, at both of Rolls-Royce's rivals, General Electric and Pratt & Whitney in the U.S., the airline recession and the consequent slackening of demand for aircraft engines has cut work-loads substantially. Nevertheless, as with the airframe manufacturers, the long-term future for the aero-engine builders is brighter. Pratt & Whitney, for example, has forecast that the total world aircraft market through to 1992 will amount to \$438bn (in 1982/\$3 dollars), of which \$17bn will be for about 4,950 commercial airliners; \$196bn will be for 21,200 military aircraft of all kinds; and \$69bn for 37,500 general aviation aircraft of all types (including business and executive jets, leisure flying and agricultural and other general duty aircraft).

Of the overall market, Pratt & Whitney estimates that the value of turbine engines sold will amount to \$138bn by 1992 (in terms of 1982/\$3 dollars), of which the commercial airliner engine market will account for over 12,000 engines, worth \$71bn; the military engine market for about 47,000 engines, worth about \$52bn; and the general aviation market for about 74,000 engines, worth some \$15bn.

Most of this business, however, will be for engines that

are either already on offer or under development, or for derivatives of them. The soaring cost of engine research and development means that today it can cost as much as \$1.5bn to \$2bn to develop and manufacture an entirely new civil aircraft engine, and much of that money is on risk for many years before commercial returns can be achieved.

Such outlays are likely to preclude the development of more than one new type of civil jet engine in each class of aeroplane in the foreseeable future, and where even that engine can be derived from an earlier model it is likely to be so.

What this means is that today's generation of commercial jet engines, and those already under development for the future, will continue in production for many years to come. They include the RB-211 in all its various versions for airliners such as the Boeing 747, TriStar and 757 airliners; the Pratt & Whitney JT-9D and General Electric CF6-50 and CF6-80 Series for such aircraft as the 747, Boeing 767, and Airbus A-300 and A-310; the Pratt & Whitney PW-2037 for the Boeing 757; and the Snecma-General Electric CFM-56 engine series for the new Boeing 737 Series 300 and other airliners.

There is scope for considerable adaptation and improvement in all of these engines, and these can be expected to occur as the airlines continue to place stringent demands on the engine manufacturers for improved fuel consumption, lower noise and reduced emission pollution, and on the airframe makers for "stretched" or other derivatives of existing types of airliner.

It is significant that in the commercial jet engine field, only one entirely new major engine is seriously being considered for development—the engine for the projected 150-seat airliner—although in other areas, such as the turbo-propeller field and in the area of small jet engines for business aircraft and other uses, several new developments are being studied.

Because of the very high costs of new engines, the power-plant for the 150-seater seems likely to be an international collaborative venture on a much wider scale than ever before undertaken.

One of the most far-reaching developments is that two of the bitterest competitors in other commercial engine fields, Rolls-

Royce and Pratt & Whitney, are now sitting down together with the three Japanese aero-engine companies, and those from West Germany and Italy, to try to formulate a joint programme to develop an engine for this new class of airliner.

The stakes are high. The market for the aircraft has been estimated at upwards of 1,000 over the next decade or so, worth perhaps \$50bn, of which the engine market is likely to account for some 3,000 units (including spares), worth about \$20bn.

Although the potential rewards are high, however, the development cost is beyond any individual manufacturer, and the collaborative venture is essential if everyone is to win some share of the market. The benefits of collaboration include not only spreading the burden of costs, but also eliminating the competition and widening the ultimate market for the successful power-plant.

At present, the discussions on the 150-seater engine centre round the RJ-500 hitherto being developed jointly by Rolls-Royce and the three Japanese engine companies, but Pratt & Whitney has also been working on ideas for an engine of its own, and these are also being brought into the discussions.

At this stage, it is not known what kind of engine will emerge, but it will clearly incorporate the best technology that each engine manufacturer can contribute.

Ideally

Nor is it yet clear precisely when the engine will emerge, although it is generally accepted that the aircraft involved will be needed some time in late 1987 or in 1988. This means that the engine should ideally become available about two years in advance, say, in late 1984, which in turn means that a start on its development needs to begin around the end of this year.

If, however, the airline recession remains for very much longer, the likely demand for both airframe and engine could be pushed back towards 1989 or even 1990, taking much of the pressure off the manufacturers.

It is hoped that the current discussions will reach some conclusion before the end of this year. The problems are not only who will produce which parts of the engine, but also how much cash each partner

will subscribe, and what kind of management structure the proposed joint venture will have.

Pratt & Whitney will be putting in its own cash, but the various European and Japanese companies will probably be seeking cash support from their governments.

The latter will need to be satisfied as to the cost, and work-sharing arrangements, and of the eventual market for such a venture, before committing themselves to any form of financial support.

Inevitable

Should the discussions on a joint venture fail, it is inevitable that each partner will go his own way. Rolls-Royce and the Japanese will return to work on the RJ-300, and Pratt & Whitney, supported by Motoren und Turbinen Union and Fiat, will return to its own studies. The resulting competition will be of benefit only in the sense that the airlines will have a choice of power-plant.

There will be a bitter fight in the market-place between the rival engine groups, and whether the latter will make any money out of such a battle is doubtful.

Apart from jet engines, there has been a significant revival in recent years in the possible development of new types of turbo-propeller powerplants — which are much quieter than jets, and use much less fuel. The turbo-prop engine is already widely used in military transport, and in the smaller, lighter types of transport aircraft, especially the twin-engine commuter or "regional" airliners seating between 30 and 50 passengers, and even in smaller aircraft used in business and general aviation.

Whereas at one time in the 1950s and 1960s, large turbo-prop airliners were in use (such as Bristol Britannias), they were effectively forced out of the mainstream of world airline activity by the advent of the jet, which then had the advantage of very cheap fuel.

The sharp rise in the price of aviation fuel over recent years, and the inevitability of further rises throughout the rest of this century, has encouraged a renewed interest in the large turbo-prop airliner, and hence in a possible return to large turbo-prop engines.

Several of the major airframe manufacturers, especially in the U.S., have project studies for large turbo-prop airliners on

their drawing boards, but so far no one has taken the plunge and announced a firm development programme, largely because so far the engine makers have not themselves announced plans for new large turbo-prop engines.

It is probable that such engines as the Rolls-Royce Tyne and Proteus, mainly used in military aircraft and hovercraft, could be adapted for use once again in commercial airliners, but here also the problem is finding enough development cash, and the need to be assured of reasonable markets.

The major propeller manufacturers, too, have been studying new developments in this field, and propellers that look more like ships' screws than the current conventional four-bladed propellers are being studied closely. These, it has been suggested, would enable airliners to fly at speeds close to those of jet airliners, but with much lower operating costs.

Whether such aircraft emerge remains to be seen, but undeniably it is an area of research that could yet have far-reaching results for the world's airlines.

Yet another major area of research is into alternative

types of fuel. At a time when the airlines use over 300m gallons of jet fuel a year, costing over \$30bn, not only is conservation essential in every way (through improved operating procedures as well as in greatly improved fuel-efficient engines), but also the search for alternative fuels is greatly encouraged.

The possibilities of using such alternatives as liquid hydrogen have been studied by a number of manufacturers, but the heavy costs involved in producing and supplying to airports round the world the quantities that are likely to be required, together with the safety factor and the heavy costs of adapting aircraft and engines to their use, tends to encourage the belief that it will be a long time before such fuels emerge as practical alternatives, if at all.

It seems that, for the immediate future, the greatest emphasis will be on the development of derivatives of existing power-plants, or of new ones, using existing fuels but with ever greater fuel-efficiencies, whilst the airlines will continue to explore every possible means of improving fuel-management so as to squeeze every possible mile from each gallon consumed.

M. D.



ADVANCED ENGINE FOR BOEING 757
Test running is in progress with an RB-211 535-B4 development engine with a high-efficiency wide-chord fan. This engine is being developed for service in Boeing 757 airliners from 1984 onwards. Its advance fan incorporates technology unique to Rolls-Royce. Recent testing has shown that fuel consumption is reduced by over 2½ per cent compared with the earlier design of the fan in the initial 535C engine.

Equipment will absorb increasing share of all-in costs

EQUIPMENT and components provide the vital third element in aerospace manufacture, ranking in importance alongside the design and production of airframes and engines.

Each sector is very closely related and changes and developments in airframe and engine technology are matched by improvements and advances in the equipment and components at the heart of contemporary aircraft.

The size of the equipment and component industries around the world can be gauged from the size of the commercial and military aircraft business.

Forecasts from Boeing, the world's leading manufacturer of commercial airliners, estimate that sales of commercial aircraft will be worth \$126bn over the next decade. One third of this spending is expected to be accounted for by equipment and components, an estimated \$40bn over the next 10 years.



A close-up of "propfan" technology—how the aircraft propellers of the future may look

Military

In the military aircraft sector the role of equipment and components involves even greater expenditure, both proportionately and in absolute terms. Industry and government sources estimate that total sales of fighter, bomber, reconnaissance and other aircraft including helicopters will be worth \$186bn over the next decade.

Breakdowns of the cost of contemporary military aircraft suggest that at least 50 per cent of the total spending on military aircraft is likely to be accounted for by equipment and components, a total of about \$98bn by 1992.

This high proportion is accounted for by the greater complexity and multiplicity of roles military aircraft are designed for.

A third outlet for aerospace equipment and components is the guided weapon sector.

Sales forecasts are more difficult to establish for guided weapons but industry sources in the U.S. suggest that over the year to 1992 the U.S. and the rest of the world together are expected to spend between \$75bn and \$100bn on all types of tactical guided weapons.

An even greater proportion of this expenditure is likely to be accounted for by equipment and components than the one-third to a half of total spending in the case of aircraft. In guided

natural carbon brakes and main wheels for the 757.

An initial order for 100 aircraft sets of wheels and carbon brakes for the eight-wheel aircraft was placed by Boeing with an option on a further 200 sets of equipment. The total value of the original contract and future replacement business over the next 20 years was estimated by Dunlop to be \$60m at current prices.

This contract could be worth \$200m for the 300 aircraft on option by world airlines. Boeing has forecast that sales of the 757 airliners could exceed 1,000 aircraft.

Structural carbon brakes are in use on Concorde, where they have a proven track record. On the Boeing 757 they are expected to achieve at least 3,000 landings and will save approximately 675 lb in weight.

This type of collaborative cross-frontier exercise has also been demonstrated by U.S. companies supplying equipment for European aircraft projects.

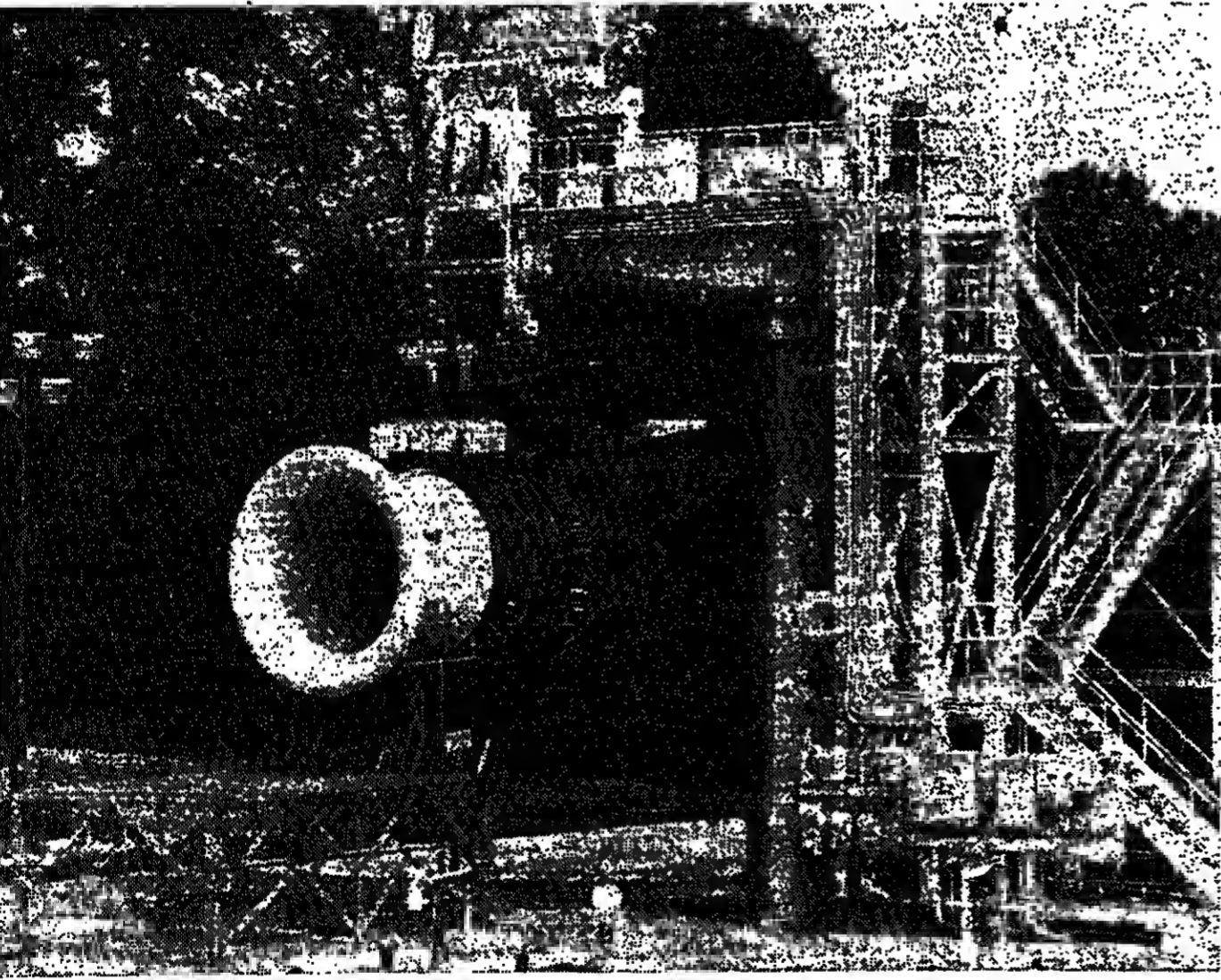
Revision

The EDO Corporation of New York has a contract to supply 6,000 ejector release units for the West German and Italian national requirement for the Anglo-German-Italian Tornado multi-role combat aircraft being produced by West Germany and Italy. A recent revision of the contract price gave EDO a total contract value of \$131m.

This type of informal "two-way-street" of sales in aerospace equipment is generally more prevalent in the civil airliner sector than in the military, where there is still a tendency for countries and companies to try and keep within national boundaries some of the more advanced technical developments, especially where these involve giving a military advantage in one country or another.

The battle to develop the next generation of advanced air-to-air missiles is a case in point and involves a desire by the U.S., Britain and Germany to collaborate to share development and production costs. At the same time, however, the national companies involved are likely to be less willing to share every detail of their own developments of equipment, produced after expensive in-house innovation and design work.

Lynton McLain



TESTS ON ONE OF THE WORLD'S MOST POWERFUL ENGINES

The General Electric Company of the U.S. commenced successful testing ahead of schedule of its CF6-80C engine (above) at GE (USA)'s outdoor facility at Peebles, Ohio. During the preliminary performance tests, the engine demonstrated a corrected thrust level of 61,000 pounds, and the specific fuel consumption was within 1 per cent of the original specification. The engine is thus one of the most powerful in the world.

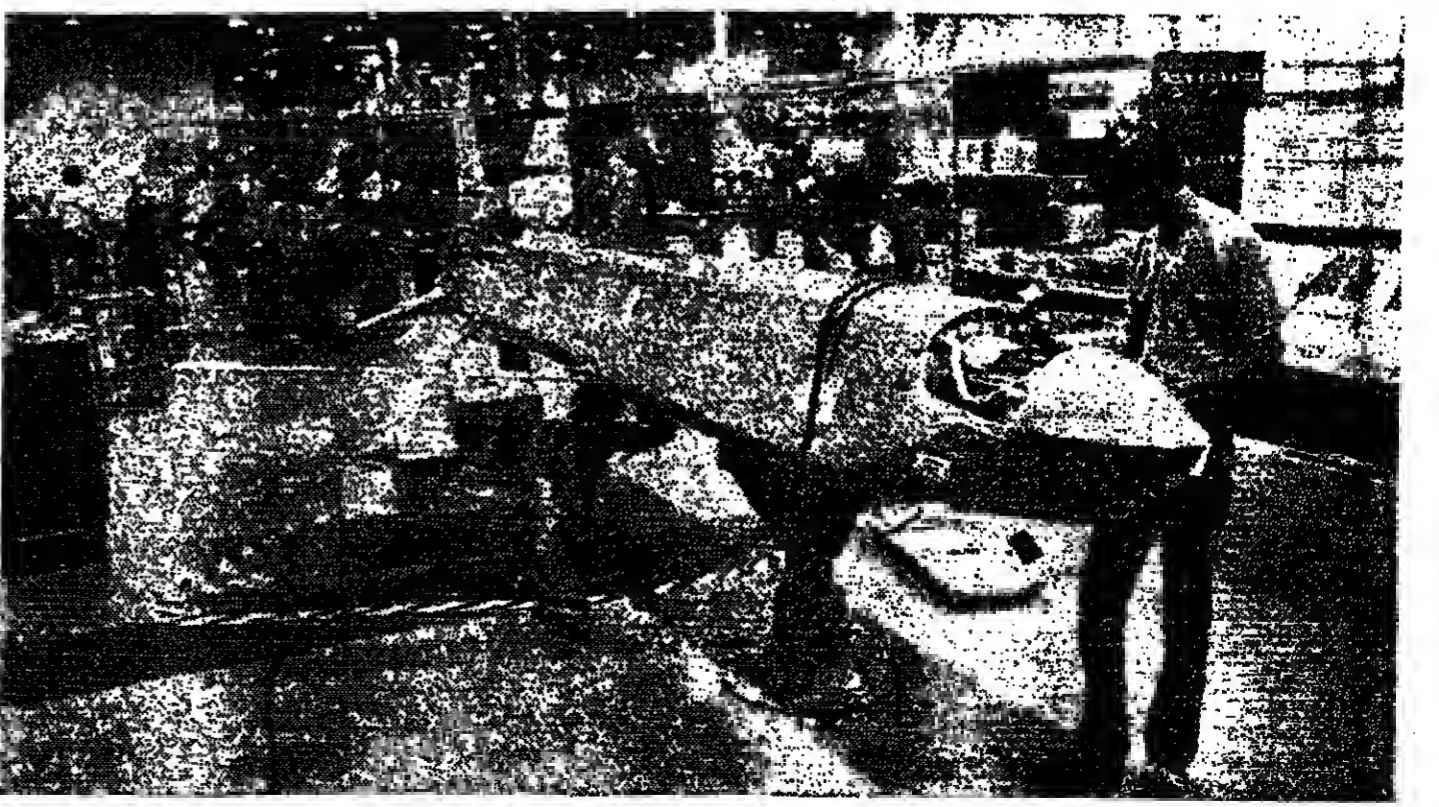


LONG-RANGE DETECTION

A NEW variant of the Westland Sea King (left) has completed trials at Westland Helicopters, Yeovil, and two are embarked on HMS Illustrations for deployment to the South Atlantic.

Equipped with an advanced marine surveillance radar, the Thorn-EMI "Searchwater" the new Sea King provides long range detection of aircraft at low and high altitudes as well as surface targets as small as submarine periscopes.

This new capability was accomplished in only 11 weeks, by close collaboration and intensive working by a joint Ministry of Defence, Royal Navy, Westland and Thorn-EMI team. Flight trials have already shown that performance of the system is outstanding and exceeds expectations.



The final assembly of a Boeing Cruise missile at the company's factory in Seattle, U.S.A. The Cruise missile, in common with other advanced guided weapons, has a simple body shell and is powered by a relatively simple motor, in this case a small gas turbine. The complexity of the missile lies at its heart, where microelectronic computers and associated electronic guidance systems account for well over 50 per cent of the total cost of the weapon. In general, components and equipment account for a greater proportion of the cost of guided weapons than is the case with even the most advanced military aircraft.

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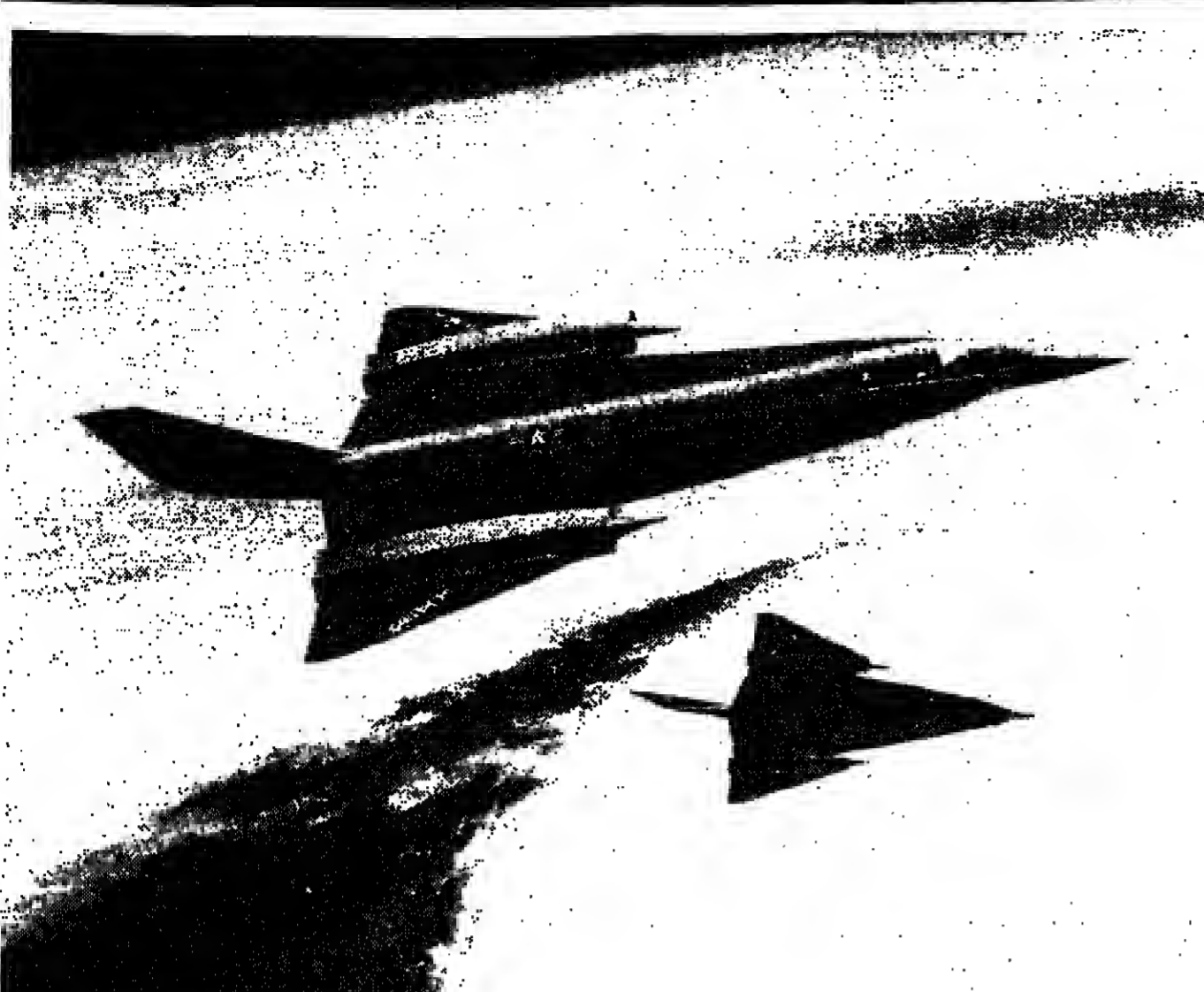
**What engine
launched
the 767, A310, 747SUD
and A300-600?
Our JT9D-7R4.**



AEROSPACE VI

Military aviation, including aircraft and missiles, is buoyant worldwide, with many countries, especially in the Third World, building up their air power. This demand will ensure a continued high volume of business for the Western world's aerospace industries for the foreseeable future

Continued strong demand for combat aircraft



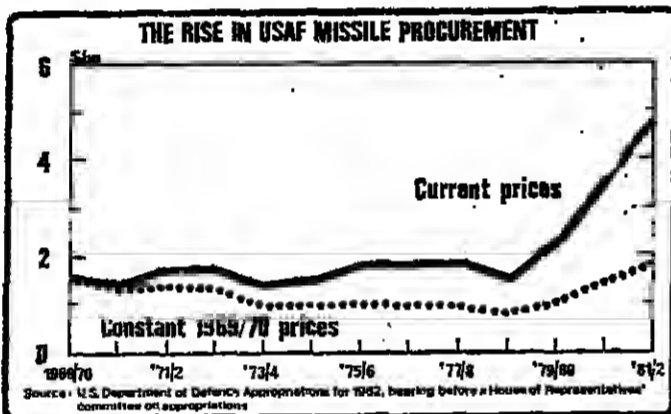
THE possible shape of things to come is illustrated in these conceptions of an Advanced Tactical Fighter under study by the Lockheed-California Company. The fighter's role would be the defence of the continental U.S. against enemy supersonic bombers but it would also have the capability to perform deep strike and air-to-air missions in any theatre of operations.

and performance, the proposed ATF would use new advanced aluminium alloys that cost less than titanium. These alloys would make feasible the airframe's manufacture under conventional fabricating methods with titanium use limited to areas of the aircraft, such as engine nacelles, subject to extremely high temperatures. Some advanced carbon graphite composites would be employed in the inner parts of the airframe.

As costs continue to rise, more and more care is being spent on perfecting missiles of all kinds to improve the capabilities of aircraft as "weapons platforms"

Guided missiles form spearhead of advanced technology

THE guided weapons sector of the world aerospace industry is set for a period of further rapid growth and unprecedented technical change. The next decade is widely expected by the industry to be marked by multi-billion dollar sales with rising exports and a level of technical advance unthought of five years ago.



These developments are set to place the guided weapons industry in a position of growing importance in the aerospace industry and in component supply industries. At the same time, military authorities and manufacturers will try to assimilate the lessons of the Falklands war — the first to provide a full-scale test of aggressive and defensive missiles in combat — and look to a future dominated by a new generation of hyper-velocity "thinking" missiles of unprecedented accuracy, with laser and particle beam weapons.

Under the MOU, the European partners and the U.S. will each have the right to produce both missiles, where necessary under licence. Britain is expected to buy the AMRAAM from the U.S. and the U.S. is expected to buy the ASRAAM from Britain and Germany. France may take part in the project at a later date. In the meantime, the design concept of the ASRAAM has still to be finalised. British Aerospace Dynamics Group is "determined to go for a hypersonic 'hitler' guided weapon, according to Admiral Sir Raymond Lygo. This approach would embrace the latest advances in guidance and propulsion technology and would enable British Aerospace to capitalise on its experience with its successful Rapier ground-to-air missile.

MILITARY AIRCRAFT activity, in contrast to the commercial aircraft business, remains buoyant world-wide, despite defence budgetary problems in some countries, and pressures for disarmament in others. Moreover, the overall long-term outlook for the military market remains good, especially with countries in the Third World increasingly interested in building up their armaments inventories.

MILITARY AIRCRAFT

Aircraft market estimates 1983-92

Aircraft type	U.S. market		Non-U.S. market	
	Units	\$B Units	Units	\$B Units
Strategic	100	17.7	100	17.7
Tactical	3,450	54.1	7,450	70.3
Transport	300	15.5	650	10.7
Other	3,850	16.6	8,400	11.1
Total market	7,700	103.9	13,500	92.1

Turbine engine market estimates 1983-92

Aircraft type	U.S. market		Non-U.S. market	
	Units	\$B Units	Units	\$B Units
Strategic	500	2.7	500	2.7
Tactical	6,600	17.4	13,000	20.2
Transport	2,200	3.6	2,300	3.7
Other	11,000	2.8	11,400	2.7
Total market	20,300	26.5	26,200	25.2

Figures in 1982 dollars. Source: Pratt and Whitney Aircraft Group, U.S.A.

model to get the F-16, or an aircraft embodying much of its technology and developed on an international collaborative basis, off the ground. The aircraft is important for the UK industry in that it is likely to be the last major new military aircraft to be developed in this country until the late 1990s.

The fact is that in the currently unstable situation that prevails in many parts of the world, the climate for arms sales has never been better, and among those sales military aircraft, especially light tactical combat aircraft of low cost, and their associated armaments, rank highly.

efforts are being made to keep aircraft in service for longer periods, while spending the available cash on improving the weapons they carry to a much greater extent than hitherto. The aircraft is increasingly being regarded as a "weapons platform", with the development emphasis and budget being concentrated upon making it carry missiles and other weapons loads of greater sophistication and destructive capability.

Another major hope for the UK industry is that the British Aerospace Hawk jet trainer and light combat aircraft, which is already in service with the RAF and has several export orders, will finally be selected as the trainer for the U.S. Navy in its so-called VTXTS programme.

At the same time, many of the countries in the Third World that might be interested in buying, are themselves constrained by lack of cash. While it is acceptable for them politically to borrow money for commercial aircraft procurement, it is much more difficult to do so for military hardware of all kinds.

Budgetary constraints in many countries are also influencing the rate at which new military aircraft are being developed. This is especially the case in the Western Alliance, where defence budgets are already strained and have to be spread over a wide variety of programmes, with military aircraft having to take their turn in the queue for development cash.

These countries cannot afford the bigger, more complex and expensive types of advanced combat aircraft, but can afford the smaller, cheaper type, and it is for this reason that estimates of future sales tend to indicate that the biggest demand will come in the tactical combat aircraft field.

Nevertheless, arms sales remain substantial, and the long-term outlook is good. One of the most detailed forecasts of the likely future strength of the world military aircraft market has been made by Pratt & Whitney Aircraft Group, part of the United Technologies group, and the world's biggest builder of aero-engines, civil and military.

The company estimates that between 1983 and 1992, there will be a market for about 200 military aircraft of all kinds, worth about \$196bn (1982 dollars) of which about \$52bn will be spent on engines and the rest on airframes.

Looking ahead, several major new programmes are either contemplated or under way. In the UK, British Aerospace, in conjunction with Rolls-Royce and several major equipment companies, has been developing as a private venture a new combat aircraft to replace the Jaguar jet strike aircraft, called the P-110. During the past summer, extensive discussions have been held with West Germany and Italy in an attempt to win international collaboration on this programme (earlier attempts to evolve a European Combat Aircraft or ECA had little success).

At the same time, advances in microelectronics and composite materials technology will enable BAE to produce the new "hitlers" at only a third or a half of the weight of existing Sidewinder-type missiles. Production of the new missiles is expected to start in 1986, with an in-service date of 1987-88.

The economies of large scale production possible under the Memorandum of Understanding between the UK, Germany and the U.S. on the new generation of advanced air-to-air weapons could well be accentuated if the new "hitler" weapons are modified for anti-tank, surface-to-air, and air-to-surface roles.

Work is also now under way in the U.S. on the big long-range supersonic Rockwell F-15B supersonic bomber, designed to carry up to 30 air-launched cruise missiles.

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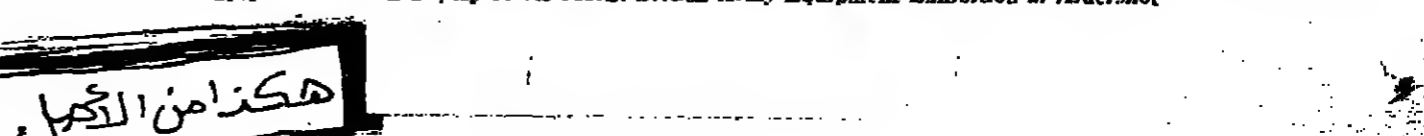
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The British Aerospace Dynamics Group's Rapier missile system which was deployed to such advantage in the Falklands conflict. It is seen here on display at the recent British Army Equipment Exhibition at Aldershot

Lynton McLain

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Lively competition in space

Over the remaining years of this century, the major space programmes of the world are likely to be dominated by the proliferation of near-Earth orbiting unmanned satellites...

While communications will head this list of uses, both for telephone and data transmissions, and also increasingly for video, tele-conferencing and direct broadcasting...

Weather forecasting is already well established, but the wide area of Earth resources monitoring is now attracting increasing attention. Activities in this field include seeking new mineral deposits...

There are also many direct scientific tasks that both unmanned orbiting spacecraft can perform, particularly to discover more about the near-Earth environment...

Although in the past most of the demand for satellites has emanated from the U.S., Western Europe, the Soviet Union and Japan...

These requirements will also generate a demand for increased launching capabilities. In the Western World, these are already being primarily met by the U.S...

As a result, it has been estimated that between now and the end of this century, there will be a world-wide demand for between 150 and 200 communications satellites alone...

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The U.S. Space Shuttle—the manned Re-usable Space Transportation System—will be one of the two means of launching Western World satellites and other spacecraft into orbit through to the end of this century and beyond.

1975 prices, the base-rate that NASA uses, which when adjusted for inflation means a 1982 cost of \$71m. This compares with the \$22m (in 1974 dollars) that a mission will cost up to 1985...

NASA estimates that the cost of putting a communications satellite into orbit from 1985 will thus rise to anything between \$20m and \$41m, depending on satellite size...

The latter organisation now bids firm orders for more than 24 rockets, of which up to 13 will be launched by 1986...

Production of Ariane rockets is being increased, from the present 4.5 a year to between seven and eight a year from 1985...

Should demand increase (and everyone believes it will), Ariane output will go up to 10 rockets a year...

The difference between the Space Shuttle and the Ariane is that the former is a manned, re-usable system...

Throughout the rest of this century, apart from some limited launch facilities available elsewhere (such as in Japan)...

Nevertheless, the competition is already fierce, and Ariane space has been highly successful in the past year in winning orders from major customers...

Arianespace aims to capture at least 30 per cent of the Western world satellite launching market in the years ahead...

The cost squeeze imposed on NASA by the U.S. Government, and its own need for cash to fund other space development programmes...

NASA and ESA have already exchanged views on these matters at the highest levels, and it is possible, but by no means yet settled...

The most likely eventual course would be for the U.S. to launch the space station, with parts of it being contributed by Europe...

Michael Donne

Airships are back in the news again—Lynton McLain explains why.

Push to get financially airborne

EARLY THIS spring an airship flew serenely over the City of London, not on a passenger flight, but simply to fly the flag of its corporate owner...

The flight raised hopes for the airship's designers, builders and financial sponsors of visible progress towards passenger and freight-carrying airships later this decade and into the 1990s...

It also underlined the crucial importance of risk finance for airship development. The reality of airship development, however, is still a long way from these ideals...

The main stumbling block slowing the development and commercial and military acceptance of airships is the weakness of the commercial and tactical case put forward by airship supporters...

It is a disappointing fact for airship supporters that the commercial benefits of airships remain almost as uncertain this autumn as they did a year ago when Skyship 500 — Airship Industries' only airship and the one which flew over the city — took to the air for the first time...

This first anniversary has some poignancy for those hoping for a revival of the airship as a tool for commerce, industry and military authorities. Skyship 500 took to the air on September 28, almost exactly 51 years earlier, on October 4 1930, another British airship...



Skyship 500, designed and built by Airship Industries on its first flight over the City of London in April. The 50 metres long craft has a top speed of 72 miles an hour and can carry up to 18 passengers.

increased the areas to be tested in the new airship. Skyship 500 is a prototype airship and it is also a flying testbed for the new materials, construction techniques and design ideas...

Airship Industries, as a result, has the task of proving the new technology as well as the general concept of the airship as a commercial form of transport or as a craft with military applications...

In addition, the company has to prove to potential users that its chosen route to airship design—the non-rigid envelope design of Skyship 500—is the best way forward...

Nevertheless, the new design features of Skyship 500 appear to work as their designers predicted, although few performance figures have been published by Airship Industries...

What is less certain is how far these design ideas and materials can be extrapolated successfully into larger and potentially more commercially viable or useful airship designs...

At the moment, Skyship 500 is severely limited in its commercial and military applications and is very much a prototype. It has a top speed of 63 knots, 72 miles an hour; a limited range; and a payload of 10 seats, as a result of its small size, 164 ft long and 46 ft in diameter, and limited volume for lift...

Airship Industries has plans for a Skyship 600 craft and a Skyship 5000, the latter designed to carry 200 passengers and a payload of 25 tonnes for a total construction cost of \$7m. Mr Keith Wickenden, the

CONTINUED ON NEXT PAGE

WHY 450 AIRLINES AND AIR FORCES FLY WITH SMITHS INDUSTRIES

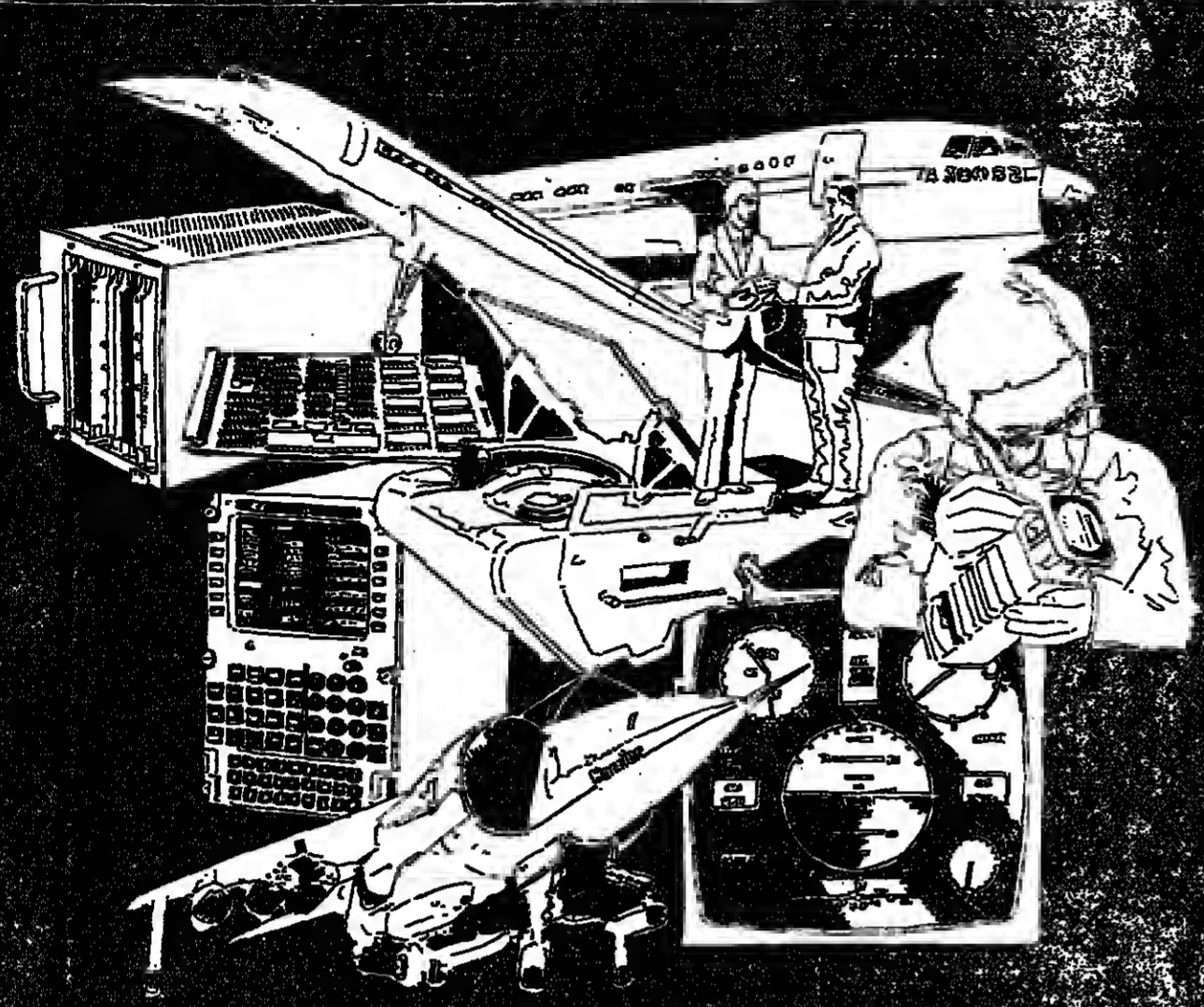


Table listing various systems and products: FLIGHT CONTROL SYSTEMS, HEAD UP ELECTRONIC DISPLAYS, MICRO CIRCUIT PRODUCTS, FLIGHT DECK DISPLAYS, WEAPON SYSTEMS, HEAD DOWN ELECTRONIC DISPLAYS, FLIGHT MANAGEMENT SYSTEMS, ENGINE AND FUEL MANAGEMENT SYSTEMS.

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Addenda Index Publication date 29 October 1982 £45 Special price £40 until 29 October 1982

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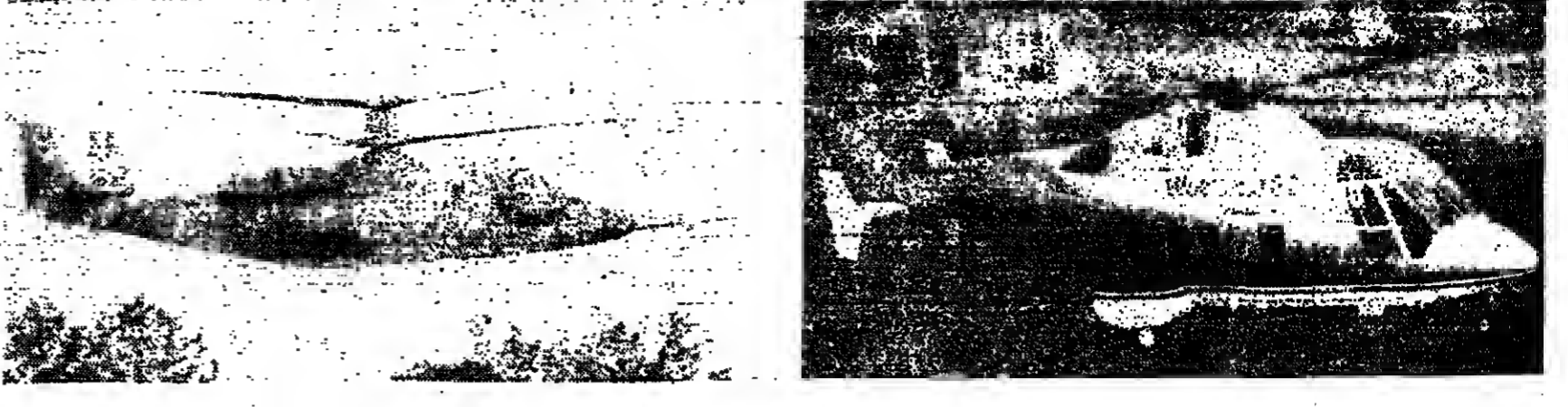
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AEROSPACE IX

FREE WORLD HELICOPTER MARKET DISTRIBUTION OF CIVIL AND MILITARY MARKETS

	1972 - 1981	1982 - 1991
Military	9,900	8,300
Civil	9,100	15,500
Total Units	19,000	23,800

Source: SIKORSKY AIRCRAFT



Sikorsky Aircraft of the U.S. is now developing an advanced helicopter concept, (left), with contra-rotating blades, to give improved performance. Right, the Westland 30—a new helicopter for commuter airlines throughout the World from Westland Helicopters of Great Britain. In production for British Airways Helicopters, Airspur Inc. of Los Angeles, SFO Helicopters (San Francisco), and other operators, the W-30 seats up to 17 passengers in wide-body comfort

Expansion ahead for helicopters

THE WORLD'S helicopter manufacturing industry has been less affected by the recession than its fixed-wing counterparts, although the rate of growth which in the 1970s was running at about 5 to 6 per cent a year has slackened.

But with a continuing demand for military helicopters, and a widening range of uses for commercial helicopters now emerging, most manufacturers believe that the long-term future is bright, and that an annual growth rate perhaps even higher than that prevailing before the recession might be achieved, especially on the

civil side, in the mid-1980s and beyond.

This confidence is based on several factors. The first is that in the military sphere, armed forces world-wide are now placing much more emphasis on the use of helicopters as logistical "work-horses," troop carriers and combat weapons systems.

One example is the recent Falklands Islands situation, where the recapture of the islands would have been made much more difficult, if not virtually impossible, without the use of helicopters as anti-submarine warfare aircraft, troop ferries, and as "gun-ships," overland. As a result of all these factors,

significant military helicopter production programmes can be anticipated through the next decade.

On the commercial side, increasing use is already being made of helicopters. Their use in the off-shore oil and gas support industry is now almost legendary—those industries could not have been exploited so rapidly without the rotary-winged aircraft—and the list of other uses is growing rapidly.

General construction, timber harvesting, utility applications (such as police work, coast-guard, customs, harbour patrol, fire-watching, traffic surveillance and ambulance duties),

are now among the every-day uses for helicopters, while a major new market is also developing in corporate and executive transport as new aircraft are tailored specifically to the needs of such markets.

New technology, and in particular the use of new composite materials, giving greater weight savings and thus helping to reduce operating costs, together with new engines giving improved fuel efficiency, are all increasing the attractiveness of helicopters for commercial operations.

Moreover, in the past decade in particular, the helicopter industry has matured, in the sense that this type of aviation is no longer regarded as unusual or even dangerous, and has become increasingly accepted by the public at large, by the military, and by the air transport and general aviation industries.

While there may still be some

problems to be overcome—for example, noise is still an area to which more attention needs to be paid, especially before direct city-centre commercial operations can become widely acceptable—the overall "social acceptability" of the helicopter is improving.

One estimate of the future military and commercial turbine-engine helicopter market suggests that between 1983 and 1992, the total demand could be as high as 17,000 aircraft, worth \$1.7bn.

But as with other types of aircraft and engines, both commercial and military, the development costs of new ventures are soaring and, in many cases, are becoming prohibitive for individual companies. One result of this is that international collaboration is rapidly emerging as a major force in the industry.

This not unusual in Western Europe, where the UK and

France (Westland and Aerospatiale) some time ago collaborated on the development of the Gazelle light helicopter, the Puma tactical troop-transport aircraft and the Lynx multi-role aircraft, and where Westland and Agusta of Italy are also now collaborating on the development of the new EH-101 as a Sea King anti-submarine warfare helicopter replacement, with civil versions also planned.

But the possibility of transatlantic helicopter collaboration is also now looming.

At the Hanover Air Show earlier this summer, Mr Robert F. Daniell, president of Sikorsky Aircraft, one of the world's biggest helicopter manufacturers, said that his company was "ready and willing to share its technology and production activities with world-wide allies."

Sikorsky is seeking industrial partners to produce its modern line of helicopters (including the S-76 commercial turbine aircraft and its R-60 Black Hawk series of advanced technology utility transports), as well as to help develop new models.

"We are not just seeking short-term co-operative efforts," said Mr Daniell. "We are also looking for long-term collateral development agreements on pre-set and future programmes."

Mr Daniell made it clear that in Sikorsky's view, the costs of research and development were now such that every R & D dollar had to be used to its full potential.

"It should not be spent duplicating helicopter technology for each country just for the sake of it. No one can afford that type of R & D redundancy."

This message has not been lost on the European helicopter industry, especially in the military sphere where the Anglo-Italian EH101 is the latest collaborative venture to be established.

Mr John Nutt, UK Secretary for Defence, reaffirmed earlier this summer that his new anti-submarine warfare helicopter would go ahead, and that it was hoped that a joint contract between the two countries could be signed early next year. Both commercial and military versions of the aircraft are planned, to increase the numbers sold and keep costs down.

Mr Nutt said that the new aircraft would be heavier than the existing Sea King if it is designed to replace, but it will be more agile, enabling it to operate from small ships safely in bad weather.

The EH-101 will also have a much greater load-carrying capacity, and will carry the new UK-developed Stingray torpedo as well as advanced sonic equipment.

generate considerable demand for advanced avionics and equipment, and provide continuity of employment for the UK and Italian helicopter industries for many years to come.

In addition to the commercial version of the EH-101, Westland is putting much emphasis on the civil W-30 development of the Lynx multi-role military aircraft. The W-30 has already entered service with British Airways Helicopters in the demanding North Sea oil and gas support role, and Westland is hoping that demand for the W-30 will eventually run to several hundred aircraft through the decade ahead.

In the military field, the role of the helicopter is also widening, and increasing use is being made of this type of aircraft as reconnaissance, anti-tank warfare and tactical assault transports overland, as well as in anti-submarine warfare at sea.

With eight major manufacturers (Westland of the UK; Agusta of Italy; Aerospatiale of France; Messerschmitt-Bolkow-Blohm of West Germany; and Bell, Boeing-Vertol, Hughes and Sikorsky of the U.S.) and several smaller manufacturers in the U.S. and elsewhere all competing for what is expected to be a market for upwards of 600 aircraft a year outside the U.S. (in that country the demand will be substantially higher), the market is expected to be tough.

It also seems likely that fewer entirely new types will emerge as development costs soar, and that the in-service lives of existing types, or their derivatives, will be extended, with much greater emphasis being placed on the weapons and other loads that these rotary-winged platforms will carry.

Michael Donne

Push to get financially airborne

CONTINUED FROM PREVIOUS PAGE

chairman of European Ferries which holds just over 11 per cent of the equity in Airship Industries, is convinced that the Skyship 5000 could offer an air service between London and Paris for passengers at £30 return.

Production of this larger and potentially commercial airship could start in 1984.

The total capital employed in Airship Industries is approximately £8m, with just under half, 44 per cent of this held by institutional shareholders.

The management of the company hold a quarter of the equity and 20 per cent is held by members of the public.

Borrowings stood at £550,000 in March, when the company announced an extraordinary development which could result

in the investment of a further £2.5m in airship designs by the Walloon Regional Government of Belgium.

Initially, the Walloon Regional Government subscribed and was allotted 325,000 shares at 125p each for £406,250 in cash. The Belgians have an option to buy a further 29 per cent of the equity.

Many of these developments are for the future. In the meantime a recent development which has effectively split the embryonic airship movement into two distinct camps is the formation of a new company to design and build rigid airships of conventional frame design.

This break-away movement is led by Major Malcolm Wren, a former chairman of Airship Industries with 3.6 per cent of

the equity in the company. He now runs Wren Skyships, a company based for the time being on the Isle of Man and committed to the concept of airships built with frame.

Aluminium alloy would be used for the rib framework of the rigid R-30 airship proposed by Wren Skyships and an alloy skin would also be used.

"The company has completed the conceptual design of this proposed rigid airship for use as a maritime patrol craft."

R-30 would have a lifting volume of 1m cu ft of helium, based on a frame 337 ft long, 75 ft in diameter, with four fins and four engines in two nacelles. The top speed would be 134 knots. Payload would vary from 15 tonnes, when the craft would have a range of 250

miles, to a crew of 13 for patrol duties when the range could be as high as 4,300 miles.

The move away from non-rigid airships of the Skyship 500 design to rigid designs with ribbed metal frames was based on the belief that non-rigid designs would be limited in size to craft with about 30m tonnes maximum payload.

£12m sought

Also, rigid airships would be designed and built on "absolutely conventional aviation grade technology," Wren Skyships said recently. There would be no need for the designers to try new technology, certainly not until the concept of the rigid airship had been proved.

Wren Skyships is currently seeking a total of £12m to fund the rest of the development, detailed design and production of the first R-30 airship.

Substantial amounts of tooling are likely to be needed for series production of the craft and the company estimates that as much as £21m would be needed to produce 50 R-30 craft, which would sell at £45m each.

The company claims to have identified a total market for 200 airships of the R-30 type with applications in maritime patrol, passenger carrying and the carriage of low density, high bulk cargoes.

The company accepts, however, that it is still a long way from raising the money and that proving the commercial case for the airship is still the most crucial task.

ment. It will be used on the new class of Type 23 frigate now under development for the Royal Navy.

A new company, EH Industries, has been set up by Westland of the UK and Agusta of Italy to run the EH-101 programme. The first flight of the aircraft is expected in 1984/85, and first deliveries to military customers is expected in 1987/1988. The commercial version of the aircraft is expected to seat about 30 passengers. The programme is likely to be substantial, costing several hundred million pounds, and it will

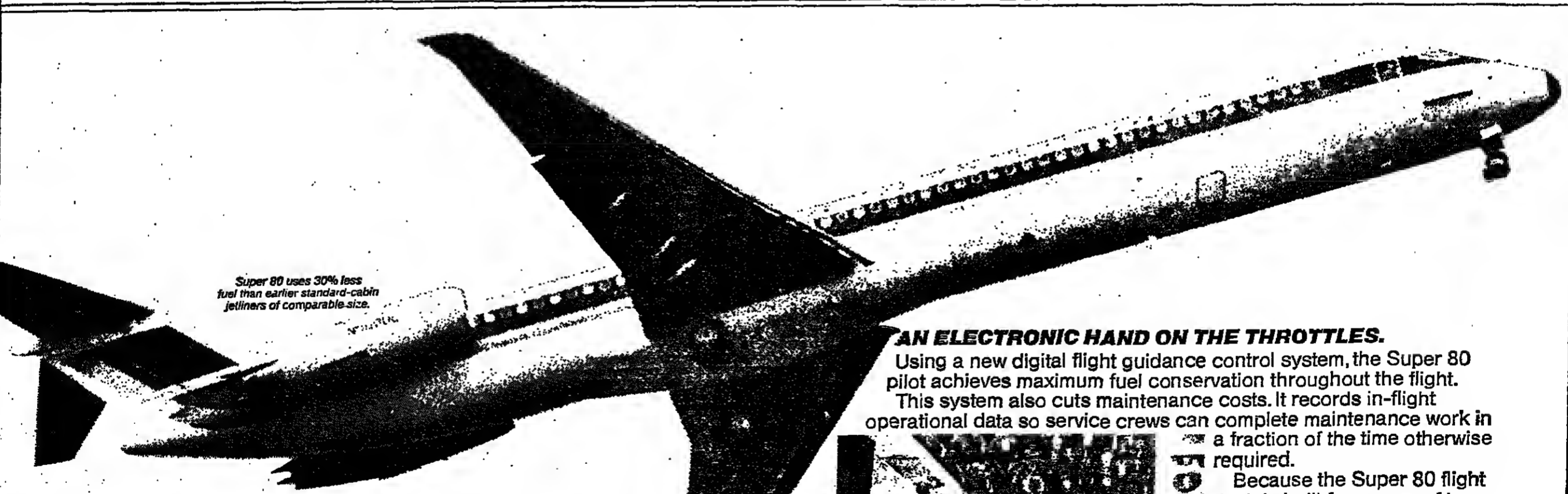
WORLD HELICOPTER MARKET

Estimates of values, 1982-91, in 1981 dollars

Type	U.S.	Europe	Rest of the world
Civil	6.6bn	2.8bn	3.1bn
Military	7.6bn	5.0bn	6.5bn

(Source: Sikorsky Aircraft, U.S.)

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AEROSPACE X

COSTS OF BUSINESS AND LIGHT AVIATION

Typical operating costs and performance for light executive aircraft

Seats	Speed in knots	Range in nautical miles	Capital cost (£)	Annual fixed cost (£)	Hourly cost (£)
Twin-engined:					
Piper Cheyenne III	11	290	2,240	1,020,000	37,890
Piper Navajo Chieftain	8	220	1,415	260,000	27,700
PA 34 Seneca III	6	193	990	135,000	80.31
PA44 Turbo-Seminole	4	185	820	105,000	8,250
Single-engined:					
Piper Warrior	4	127	640	35,000	7,195
Piper Arrow IV	4	143	935	60,000	11,495
Piper Saratoga SP	6	150	960	75,000	7,712

Source: CSE Aviation, Oxford.

GENERAL AVIATION

Aircraft type	U.S. market		Non-U.S. market		U.S. market
	Units	SB Units	Units	SB Units	
Feeder - commuter fixed wing					
1,100	3.6	3,600	10.9	4,700	14.5
Business-utility fixed wing					
10,500	26.4	5,000	10.5	15,500	36.9
Helicopters					
7,800	7.8	9,500	9.5	17,300	17.3
Total market	19,400	37.8	18,100	30.9	68.7
Turbine engine market estimates 1983-92					
Aircraft type	U.S. market		Non-U.S. market		U.S. market
	Units	SB Units	Units	SB Units	
Feeder - commuter fixed wing					
3,100	0.8	9,400	2.3	12,500	3.1
Business-utility fixed wing					
22,600	5.7	10,700	2.4	33,300	8.1
Helicopters					
12,700	1.1	15,500	1.7	28,200	3.1
Total market	38,400	7.9	35,600	6.4	74.0

Source: Pratt and Whitney Aircraft Group (U.S.A.)

Lynton McLain examines the impact of the decline in economic activity, the rise in fuel prices and the high cost of operating aircraft in the general aviation category

International demand for general aviation aircraft has plummeted

PRODUCTION OF new light aircraft for business and pleasure has plummeted in the U.S. and the industry faces its most testing time for years. The U.S. is the world's main light aircraft manufacturing base and is the main market for general aviation aircraft, ranging from turboprops and turboprops to single-engine piston aircraft.

Exports from the U.S. have also fallen, reflecting the decline in economic activity in world markets for business and light aircraft.

The previous high rates of growth in the fleet of general aviation aircraft in the U.S. have slowed substantially. Total flying time by these aircraft has dropped sharply as companies operating the aircraft retrench in the face of limited or zero growth in their own sectors.

These trends reflect the impact of the decline in economic activity, the rise in fuel prices and the high costs of operating aircraft in the general aviation category.

The sector embraces aircraft for use by companies and individuals on business, for pleasure, for use as agricultural spray platforms, as computer carriers, air taxis and as platforms for specialised industrial work such as surveying, photography and pipeline patrols. Most of these have been hit by the recession.

The decline in economic activity has forced many users, but especially those using aircraft for business purposes, to reassess the cost-effectiveness of the aircraft at a time when management is under pressure to cut costs.

Business aviation is in the doldrums in terms of economic activity

ments does not, however, suggest that the days of company-owned business aircraft are numbered.

Forecast by the U.S. Federal Aviation Administration (FAA) predict that growth in the general aviation sector as a whole between 1981 and 1993 will average 4.4 per cent a year. At this growth rate the FAA estimates that the fleet of aircraft will increase by a net 10,000 aircraft a year over the same period.

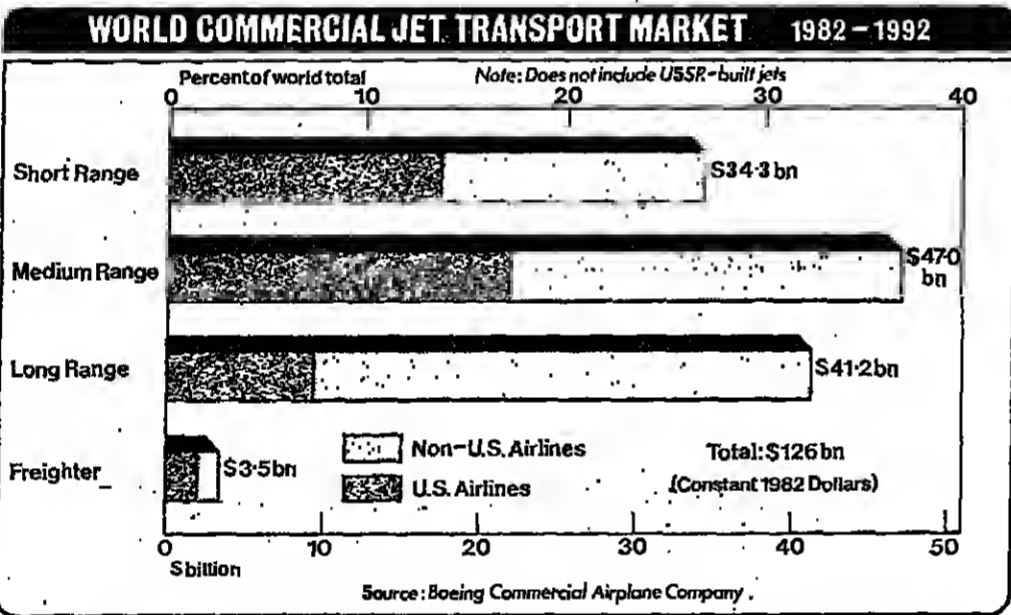
In particular the number of turboprop aircraft is expected to double to 9,500 by 1993 and the number of turboprop aircraft also is expected almost to double to 6,300 over the same period. These are the categories of aircraft favoured by business operators who are likely to provide much of the new business when the recession lifts.

Meanwhile, "business aviation is in the doldrums in terms of economic activity," according to Mr John H. Winant, president of the National Business

FORECAST SIZE OF U.S. FLEET OF GENERAL AVIATION AIRCRAFT, 1982-1993

Forecast as of	Total	Piston				Turboprop		Rotorcraft		Ballons, dirigibles, gliders
		Single-engine	Multi-engine	Turboprop	Turboprop	Piston	Turbine			
1982	220.4	173.9	26.6	4.8	3.3	3.0	3.5	5.3		
1983	226.4	178.0	27.6	5.2	3.4	3.1	3.6	5.5		
1984	233.2	182.7	28.6	5.6	3.6	3.2	3.7	5.6		
1985	241.6	188.9	29.6	6.0	3.8	3.3	3.9	6.1		
1986	250.3	195.3	30.7	6.4	4.2	3.7	4.2	6.8		
1987	260.5	203.0	31.8	6.4	4.0	3.6	4.0	6.5		
1988	271.6	211.2	33.1	7.2	4.4	3.9	4.5	7.3		
1989	284.6	221.1	34.6	7.6	4.7	4.1	4.7	7.8		
1990	300.3	233.0	36.4	8.0	5.1	4.4	5.0	8.4		
1991	317.3	245.8	38.4	8.5	5.5	4.7	5.4	9.0		
1992	334.7	259.0	40.4	9.0	5.9	5.0	5.7	9.7		
1993	352.7	272.7	42.4	9.5	6.3	5.3	6.1	10.4		

Source: FAA.



In Britain general aviation is much less well developed than in the U.S. A total of 6,738 general aviation aircraft are registered in Britain, with almost two thirds used for private and business purposes.

These aircraft have access to over 200 airfields in Britain and an estimated 2,000 or more airfields throughout the Continent, according to the General Aviation Manufacturers and Traders Association based near Aylesbury.

Most of these airfields are within easy access of centres of population and can provide a rapid transport link for business executives wishing to avoid the queues and the hassle of major airports such as Heathrow.

The association says that general aviation in Britain is not dominated by leisure and sport flying. These activities account for only 10 per cent or less of all light aircraft operations in the country compared with business aviation, which

Turbo jets and turbo props were the only two categories of light aircraft to show growth in the U.S. last year

accounts for 65 per cent of all the hours flown by light aircraft. Training accounts for 20 per cent of the time and agricultural aviation and other aerial work about 6 per cent.

Business aircraft are "time-machines," offering the convenience of direct travel between points which may have no formal air connections, the association says. At the same time access to a business aircraft makes it possible for business executives to tailor their journeys so as to fit complex multi-stop journeys into their working days.

Provided the company has done its sums this approach could save time and money and could increase substantially the productivity of the executive.

The company has to compare business aircraft costs with the total costs of using conventional transport, a commercial airline, taxi and air from airports and possibly a night in a hotel because a return flight is not possible within a sensibly long working day.

Air taxi companies offer a similar service to business executives but without the executive incurring the costs of owning a business aircraft.

Britain has over 100 specialist companies offering air taxi services based on 250 light aircraft, from multi-engine piston, turbine and jet aircraft to helicopters. This fleet carries over half-a-million passengers and 4m kg of freight throughout Europe, Africa and the Middle East each year.

The air taxis are available on an ad hoc basis or on regular charters to provide a personal service and a role the commercial airlines do not offer.

The D-3300 is the latest design study by McDonnell Douglas of the U.S. for the projected 150-seater airliner in which several manufacturers are showing considerable interest for the later 1980s

Bankers had predicted that \$160bn in new cash would be needed to purchase aircraft worldwide in the next decade—but these estimates are being scaled down, as Alan Friedman reports.

Airline financiers are taking an increasingly cautious viewpoint

"OUR MOTTO this year is don't be brave, be smart." These words come from Mr Tony Cooper, head of Midland Bank's aerospace finance department. They seem somewhat more than poignant coming from an aerospace banker seated at a table just yards away from a desk-top model of Sir Freddie Laker's Skytrain.

Mr Cooper's bank has received a fair amount of criticism over the collapse of Laker Airways last February and although Midland's financial losses are controllable, the psychological damage is not.

Beyond the unfortunate tale of Laker Airways, however, is the more alarming financial condition as a whole of the world airline industry. Braniff (Big Orange) has declared bankruptcy and several other U.S. airlines are facing similar collapse.

The recession continues to affect air travel. The dramatic growth of many airlines in recent years is resulting in a text-book case of overcapacity. All this in turn raises a large question mark over the hitherto glamorous business of airline finance.

Until recently the accepted wisdom was that of a total of \$160bn in new cash would be required over the next decade to finance the purchase of aircraft worldwide. While the aircraft makers may remain hopeful about the long-term outlook, bankers are now scaling down this estimate as too optimistic.

Bankers such as Citicorp, Chase Manhattan, Midland Bank, Credit Lyonnais and Bankers Trust in airline finance may continue to play a prominent

role in the financing of new and replacement aircraft purchases but every aircraft banker in the business is becoming increasingly cautious.

Midland Bank, as the designated UK agent for the financing of aircraft from Airbus Industrie, is a case in point. Mr Cooper reckons there will be a "natural decline" in the number of aircraft finance deals for the next few years. "We are not deliberately running our book down, but our book is running down," he explains.

Not only is there less business; other banks are training their sights on the market leaders. In the UK both

Bankers are likely to seek more and more guarantees for aircraft loan packages

Lloyds Bank and National Westminster Bank have recently taken business away from Midland.

Lloyds Bank, which says it will be taking a more aggressive stance, recently completed a \$55m 10-year credit for Air India as part of an Airbus finance package.

For a variety of reasons Lloyds was able to offer more attractive terms than Midland. But Midland insists it is still predominant when it comes to export credits for Airbus deals.

Since 1979, when Midland set up its specialist Airbus department, it has extended a total of \$2bn of aircraft loans. Of this lending around 80 per cent is

backed by guarantees from the Export Credit Guarantee Department (ECGD). A further 15 per cent of the exposure is on state carriers and the balance, according to Mr Cooper, is to independent carriers.

Mr Cooper claims that "his aircraft book" is as solid as the Rock of Gibraltar. He is not worried about Midland Bank's exposure. What about the precarious state of several airlines? This does not threaten Midland if there are state guarantees.

"Where I've got ECGD cover I shrug my shoulders and don't care," says Mr Cooper. "Where I have to put up front-end money I'm damn cautious," he adds with a smile.

On Airbus deals Midland handles 20 per cent of the financial package normally; the rest is shared among French and West German banks. Government guarantees on Airbus transactions usually cover 82.5 per cent of the purchase price.

Looking ahead it would seem that bankers will seek more and more guarantees for aircraft loan packages. New money may come from airlines' internal resources in part but the bulk will have to come from government guarantees, grants and from borrowings on the international capital market.

Being an aerospace banker is still a challenging career but it may not be quite as exhilarating a proposition as it was during the go-go period of the last decade. Mr Cooper still takes pride as he strides out of Midland Bank with a new aircraft finance package tucked under his arm, but his new motto echoes eerily behind him: "Don't be brave, be smart."

WORLD JET AIRLINER TYPES AVAILABLE DURING THE 1980s

CATEGORY	TYPE	CURRENT MAKER	ENGINES	NUMBER OF PASSENGERS † (approx.)	TYPE	POSSIBLE FUTURE MAKER	ENGINES	NUMBER OF PASSENGERS † (approx.)
SHORT-RANGE (up to 2,000 nautical miles approx.)	One-Eleven	British Aerospace	Two	65-119	7 DASH 7	Boeing	Two	150 (c)
	F-28	Fokker	Two	65-85	A-320-100/200	Airbus Industrie	Two	150 (c)
	DC-9-30/80	McDonnell Douglas	Two	105-172	D-3300	McDonnell Douglas	Two	150 (c)
	737-200	Boeing	Two	115-130	DC-9 RE(a)	McDonnell Douglas	Two	105
	737-300	Boeing	Two	121-148	TA-9-100	Airbus Industrie	Two	410 (c)
	747 SR*	Boeing	Four	450				
	146-100/200	British Aerospace	Four	71-109				
	727-200	Boeing	Three	140-189	DC-10 Derivatives	McDonnell Douglas	Three	250 (e)
	757-200	Boeing	Two	224	747 Stretch	Boeing	Two	250 (c)
	767-200	Boeing	Two	255	TA-9-200	Airbus Industrie	Two	400 (c)
MEDIUM-RANGE (Up to 3,500 nautical miles approx.)	A-300-2/4/600	Airbus Industrie	Two	220-336	727 RE(a)	Boeing/Lockheed	Two	140-180
	A-310	Airbus Industrie	Two	195-255				
	DC-10-10	McDonnell Douglas	Three	250-400				
	L-1011	Lockheed	Three	250-400				
	747-100/200	Boeing	Four	482	767 HGW(b)	Boeing	Two	250 (c)
	747 SP†	Boeing	Four	330	DC-10 Derivatives	McDonnell Douglas	Three	250-400 (c)
LONG-RANGE (Over 3,500 nautical miles approx.)	DC-10-30/40	McDonnell Douglas	Three	250-400	747 Derivatives (d)	Boeing	Four	500 (c)
	L-1011-500	Lockheed	Three	250-400	TA-11-100/200	Airbus Industrie	Four	220 (c)
					TA-12	Airbus Industrie	Two	220 (c)
FREIGHTER	747 F/C	Boeing	Four	—				
	DC-10C	McDonnell Douglas	Three	—				
	A-300C	Airbus Industrie	Two	—	757/767F	Boeing	Two	—

† Numbers of passengers are approximate only; configurations vary very widely between airlines and according to aircraft version used.
* Short Range. † Special Performance.
(a) Re-engined. (b) High Gross Weight. (c) Final configurations not yet determined, with designs still undergoing changes. (d) Stretched Upper Deck 747 already in production.



Boeing 727 aircraft of Braniff International at Dallas/Fort Worth, Texas

Lynton McLain examines the scale of spending forecast for the expansion of international airports.

Airport planners remain optimistic

WORLD AIRPORTS are emerging from one of their worst trading periods for many years. Passenger and air freight volume plummeted last year. Traffic this year, however, is picking up slowly although there are few signs as yet that airports are set for an immediate return to the buoyant rates of growth of the late 1970s.

Nevertheless, airport planners predict confidently that growth will return to the passenger and air freight markets. This confidence is supported by recent modest returns to growth already noted, ahead of this year's traditional summer peak, and by the scale of spending forecast for airport expansion plans.

The underlying strength of air transport was noted by Mr Norman Payne, the chairman of the British Airports Authority, in his latest annual report. This showed that passenger traffic at the authority's seven airports in the UK increased by 1 per cent in the 1981-82 financial year despite the continued depressed state of world economies and only tentative indications of an improvement in the UK's economic health," Mr Payne reported.

About-turn

The modest about-turn in the fortunes of airport operators so far this year is illustrated by recent figures for traffic at Heathrow Airport, London, the BAA's main airport and still the busiest international airport in the world, with 22.5m international passengers last year despite the slump in demand for air services.

The sharp drop of 9.5 per cent in air transport movements at Heathrow in 1981 compared with the previous year has been reversed in recent months and in June aircraft movements were 9 per cent higher than in June 1981.

Similarly, the 3.9 per cent drop in the number of passengers at Heathrow last year compared with 1980 has been reversed this year, with passenger volume 6 per cent up in June compared with the corresponding month last year.

These returns are encouraging signs for airport planners that traffic is returning to historic patterns of growth. They also underline the need for increased airport capacity.

Forecasts from airport authorities suggest that the total market for new airports and for the expansion of exist-

AIRPORT ACTIVITY 1981							
Airport	Country	Air transport movements		Terminal passengers		Cargo (tonnes)	
		000's change	%	000's change	%	000's change	%
Amsterdam	Netherlands	138.1	- 3.9	9,669	+ 2.9	329.7	+ 3.7
Brussels	Belgium	81.7	- 4.9	5,060	+ 2.0	156.6	- 5.4
Copenhagen	Denmark	134.3	- 7.5	8,192	- 4.5	139.6	+ 0.1
Frankfurt	West Germany	207.0	- 0.9	16,953	+ 0.5	600.0	- 0.9
Geneva	Switzerland	68.5	- 1.4	4,171	+ 5.5	32.7	- 5.5
Glasgow	Scotland	49.3	- 3.1	2,267	- 3.1	12.4	- 3.7
Lisbon	Portugal	38.0	- 3.8	2,940	+ 5.0	46.2	- 5.7
London (Gatwick)	England	125.1	+ 1.3	10,729	+10.5	182.5	+10.4
London (Heathrow)	England	247.1	- 9.5	26,400	- 3.9	450.4	- 3.8
Madrid	Spain	114.4	- 7.5	9,960	- 1.8	151.0	+ 4.8
Paris (Charles de Gaulle)	France	202.0	- 0.6	10,935	+ 8.4	447.3	+11.2
Rome	Italy	134.6	- 6.6	10,921	+ 3.0	124.5	-11.3
Atlanta	U.S.	523.1	- 6.4	37,594	- 6.3	329.4	+ 5.7
Chicago (O'Hare)	U.S.	554.5	-11.2	37,976	-14.5	792.0	- 2.0
Dallas (Fort Worth)	U.S.	445.8	+ 2.3	23,533	+ 7.2	218.4	+10.8
Hong Kong	Hong Kong	55.4	+ 1.5	8,224	+20.4	390.3	+12.6
New York (JFK)	U.S.	228.0	- 3.4	25,752	- 3.9	1,191.5	+ 1.9
Washington (National)	U.S.	193.5	- 4.5	14,175	- 2.5	20.1	-21.5
Sao Paulo	Brazil	102.9	+ 2.2	5,621	+ 3.7	69.2	+27.4
Tokyo (Haneda)	Japan	224.0	-	21,235	+ 2.0	202.3	+ 4.3

Source: British Airports Annual Report 1981-82.

ing airports is likely to be worth not less than \$20bn by the year 2000.

Much of this spending, was committed before last year's slump in demand for airline services and all the signs suggest that developments are likely to go ahead on much the same timescale as planned.

Major airport development programmes are underway in most countries of the developed and developing world. Some of the projects, such as that for the second Bangkok international airport, are on green-field sites and will involve multi-million dollar programmes. Other projects are more modest and involve an updating of passenger facilities and equipment for aircraft control and handling.

Airport projects in the 1970s and 1980s have involved, to a greater and greater extent, specialised groups of international airport consultants. In Europe these include Aeroporti de Paris and Sofrevis of France; the Frankfurt Airports Authority of West Germany; NACO, the Netherlands airport consultancy organisation; and the British Airports International-BAI group.

BAI is a partnership of airport specialists from the British Airports Authority, which runs seven of Britain's airports, and International Aeradio (IAL), the airport management consultancy and equipment maker majority owned by British Airways.

An international consortium recently won a \$1m contract to carry out a feasibility study for an international airport in Macau. Members of the consortium are Consuplano of Lisbon, Portugal; China Airport Engineering Consultants (CAEC) of Beijing; Stradbag Bau, of Cologne; Lufthansa German Airlines, Cologne; and HLT, Wiesbaden. The project is to be managed by Airconsult, a subsidiary of Flughafen Frankfurt-Main, the Frankfurt Airport Authority.

Typical of the international airport projects currently underway are those involving BAI. The group is working on over half-a-dozen major airport projects, most of them in small and medium-sized countries with developing air transport systems.

The group starts work in September on preliminary designs for a new international tourist airport at Tabarka in the north west Tunisia. The airport BAI is on the short list for design work for a new green-field airport.

The largest project the international consultancy groups are bidding for at the moment is the proposal for a second international airport at Bangkok. This proposal, the so-called "Cobra Swamp" project, is for a new major international gateway airport for Thailand, to be built at Nong Nua Hoa, to handle 10m passengers a year.

Competition for a major share in this project is intense. BAI and five UK civil engineering consultants joined together to form the British Airport Consultancy group at the end of last year to make a single concerted British bid for contracts to carry out the main economic study and the preliminary and final design studies for the "Cobra Swamp" airport.

Sub-contractors

The new consultancy has invited the UK Civil Aviation Authority, Kleinwort Benson (merchant bankers) and Coopers and Lybrand, management consultants, among others to be sub-contractors to the consultancy for the project.

Existing airports last year were dominated, however, by the general decline in passenger and air freight activity, with airports in Europe, the U.S. and elsewhere almost all hit by the general fall in air transport movements.

In Europe the fortunes of airport operators ranged from the substantial fall of 26.4 per cent in air transport movements at Prague airport, Czechoslovakia, to the increase of 9 per cent in aircraft movements at Tenerife's Reina Sofia airport.

Generally the airports with growth last year were those airports with relatively modest traffic flows, such as Dublin with a 5.8 per cent increase in passengers; Helsinki with a 6.1 per cent increase in passengers; Istanbul with a 24.8 per cent increase in passengers; Nice with a 9.8 per cent increase in passengers; and Stockholm, with a 8.7 per cent increase in passengers.

Downturns in traffic volume were reported by most airports serving industrial and commercial centres throughout the world, while airports serving holiday centres generally

handled more people last year than in 1980.

Other centres with greater-than-average air traffic activity included cities with oil-related business, including Houston, Texas, with 5.5 per cent more passengers last year, and Mexico City, with a 14.7 per cent increase in passenger volume.

The general decline in air transport movements at U.S. airports last year, however, has to be seen against the background of the strike by U.S. air traffic controllers. The strike disrupted normal patterns of airline operations and increased the volume of private and business aircraft traffic.

The extent of the slump is clear when last year's 38m passengers at Chicago O'Hare International Airport are compared with the 46m passengers who used the airport in 1978, its peak year.

Nevertheless, the City of Chicago Department of Aviation is confident about future demand and has a master plan to boost capacity at the airport to about 80m passengers a year by the end of the century.

Despite the downturn in traffic world airports still handle great numbers of passengers and thousands of tonnes of freight last year. Chicago O'Hare airport was the busiest in the world in terms of terminal passengers, with a total of 37.9m domestic and international passengers, a volume rivalled only by Hartsfield Atlanta International Airport, with 37.5m passengers last year, 6.3 per cent down on 1980. Hartsfield is continuing to feel the slump in demand and in June, the latest month for which figures are available, passenger numbers dropped by 10.2 per cent to 3,02m compared with June 1981.

All this decline in demand for air services has not stopped almost all countries, including the U.S., from investing in new terminals, new runways, advanced passenger handling facilities and complete new airports, sometimes for prestige purposes but generally to handle future demand for air travel.

In Britain the British Airports Authority (BAA) has forecast an average annual growth rate of between 4.5 per cent and 6 per cent for air traffic into and out of the UK for the rest of the 1980s. A slightly lower rate of growth, between 3 per cent and 5 per cent a year, is forecast by the authority for the 1990s.

To help meet this expected increase in demand for airport capacity, the BAA plans to spend £550m (March 1982 prices) on its seven airports by the 1985-87 financial year. This expenditure is on top of the £237.8m spent by the authority in the last financial year (1981-82) to raise capacity and to boost operational efficiency at its airports.

The BAA plans to spend the greatest part of this future expenditure on its proposed development of the third London airport at Stansted. This will involve £200m for a new terminal building and other facilities to raise the capacity of Stansted from its present 1m passengers a year to 15m passengers a year under the first phase of development. This would be based on the existing single runway at Stansted.

The BAA would like to add a second runway eventually to boost the capacity of Stansted to 50m passengers a year.

New Terminal Four

The second largest investment project earmarked by the BAA under its current corporate plan involves spending £173.9m on the new Terminal 4 at Heathrow Airport, London. Work on this project to boost capacity at Heathrow from 30m to 38m passengers a year by the mid-1990s has already started.

The authority also plans developments at the existing three terminals at Heathrow, involving over £40m of further investment. Motor traffic flow in and around the airport is also to be improved, with £12.5m earmarked for new roads and car parks.

The authority wants extra capacity at Gatwick Airport and £151.5m has been allocated in the corporate plan for the first phase of the proposed new Terminal 2 at Gatwick. The Terminal has been recommended for approval after a public inquiry but the go-ahead from the Government is still awaited.

The BAA also plans to spend several millions of pounds at its four airports in Scotland—Edinburgh, Glasgow, Aberdeen and Prestwick. The authority acknowledges that it will have to borrow to complete this £80m investment programme but it still hopes to self-finance at least 60 per cent of the total programme.

At the same time, the Authority has set up a working group with the Treasury and the Trade Department to study ways of providing private capital for the investment programme over the next five years. The issue of a "general performance bond" linked to the authority's profits is one idea. The other main proposal to be considered is the possible provision of equity finance through a subsidiary company. This would then participate in the authorities' concessionary income—duty-free goods, rents and franchises—on a royalty basis. The authority would like to raise between £50m and £100m from external sources.

Elsewhere in Britain the 23 main local authority airports expect to spend a total of £50.5m in 1982-83 on airport developments. More than 12.5m passengers are expected to use these provincial airports, a rise of over 4 per cent compared with 1981-82.



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AEROSPACE XII

Aerospace developments around the world: here and on the following six pages, FT correspondents examine advances being made by individual nations.

Fighting hard to keep pace with the West

DEVELOPMENT of a modern and diversified civilian and military aerospace industry has long been a top Soviet priority and proof to itself and others of the scientific and technological progress made by the Soviet Union since the 1917 revolution.

It is becoming increasingly clear, however, that the Soviet aerospace industry is finding it increasingly hard to keep up with the pace of technological change and development generated by engine and airframe companies in the West which, in turn, are being forced to pool resources and rationalise their production in order to find the huge sums required to develop new fuel-efficient engines and airframes.

Traditionally, Soviet civilian aircraft tend to lag a

generation behind their western counterparts, the latest example of this being the belated introduction of the Ilyushin IL-86, the Soviet Union's first wide-bodied "Airbus" on domestic and international routes over the past 12 months.

Now that the 350-seat, four-jet aircraft is in service to Western capitals, such as Paris and Madrid, the Soviets have finally agreed to allow Western wide-bodied aircraft to fly through Soviet airports.

The first Jumbo jet of Air Japan inaugurated a new wide-body service from Tokyo across Siberia via Moscow to Western Europe in April and Air France now also flies Airbuses to the Soviet capital. In return, regular AeroBot IL-86 flights link Paris to both Moscow and Leningrad.

Although the Airbus is now operational, realisation of its full potential awaits future modifications—including more powerful and more fuel-efficient engines than the 28,000 lb thrust motors powering the current models.

On most flights AeroBot aircraft fly with the maximum permitted passenger loads. Tickets are still relatively cheap for Soviet passengers and vast distances make air transport the preferred means of transport for millions of Soviet citizens.

Over 530m passengers will be carried by AeroBot over the current five-year plan period at seat capacity ratios

which is needed for the harsh weather conditions and frequently non-tarmac runways of many Soviet provincial airports, especially on internal feeder routes.

But export sales so far have been relatively modest and concentrated on other Comecon airlines, including Cuba and Vietnam. Export sales in 1980 were around 600m roubles (\$750m).

But considerable interest has been generated in the 40-ton capacity, high wing, four jet IL-76 civilian and military transport aircraft, of which several have been sold to Iraq, Libya and other countries.

The new Yak-42 intermediate range aircraft with rough airstrip take-off capacity and high climb rate also has considerable export potential, as did its predecessor, the smaller Yak-40.

Avia-Export, the Soviet aircraft sales and service organisation, also has high hopes for its AN-72 STOL aircraft, which attracted much attention at the Paris Air Show.

Soviet helicopters also have a high reputation, reflecting the resources which have been channelled into an area with major military and civilian applications—especially in transporting heavy or bulky equipment to mining camps and pipeline installations often sited in trackless wastes or permafrost areas of the east and far north.

Development of hovercraft, dirigibles and other "lighter than air" craft is also proceeding apace.

Meanwhile, in space the Soviet Union continues to send up large numbers of military and civilian satellites for a wide range of purposes and continues with its Soyuz manned orbital space platform programme.

A Frenchman—Jean-Louis Chretien—and two Soviet Cosmonauts successfully rendezvoused in space with the Soyuz-7 Station in July, the first East-West space rendezvous since the Apollo-Soyuz link-up between U.S. and Soviet spacecraft in 1975.

The Soyuz programme continues, as does military development of killer satellites, arming laser guns and other "Sci-fi" horrors.

SOVIET UNION

which would make fortunes for Western airlines forced by competition to slash fares and still fly at around 60 per cent capacity.

Despite high capacity utilisation, however, the high fuel consumption of most Soviet aero-engines has stimulated development of more fuel-efficient variants and these have been introduced on modified versions of the Tupolev TU-154 intermediate-range tri-jets and TU-134 twin-engine jets. A new fuel-efficient engine, code-named the Lotarev D-36, has also been developed to power the new 120-seat Yakovlev Yak-42 tri-jet and the new high-wing STOL aircraft, the Antonov AN-72.

Fuel consumption of the D-36 engine is claimed at 34 grammes of fuel per passenger/kilometre.

But the most pressing need of the Soviet civilian aircraft industry is for the introduction of high-efficiency by-pass engines similar to those produced by Rolls-Royce and the major U.S. and European engine consortia.

This need is highlighted not only by problems with the Soviet Airbus but also by the worrying frequency of crashes suffered by the IL-62 long-distance airliner with its four heavy and thirsty rear-mounted engines.

Although heavier and less efficient than comparable Western aircraft, Soviet models do have a ruggedness

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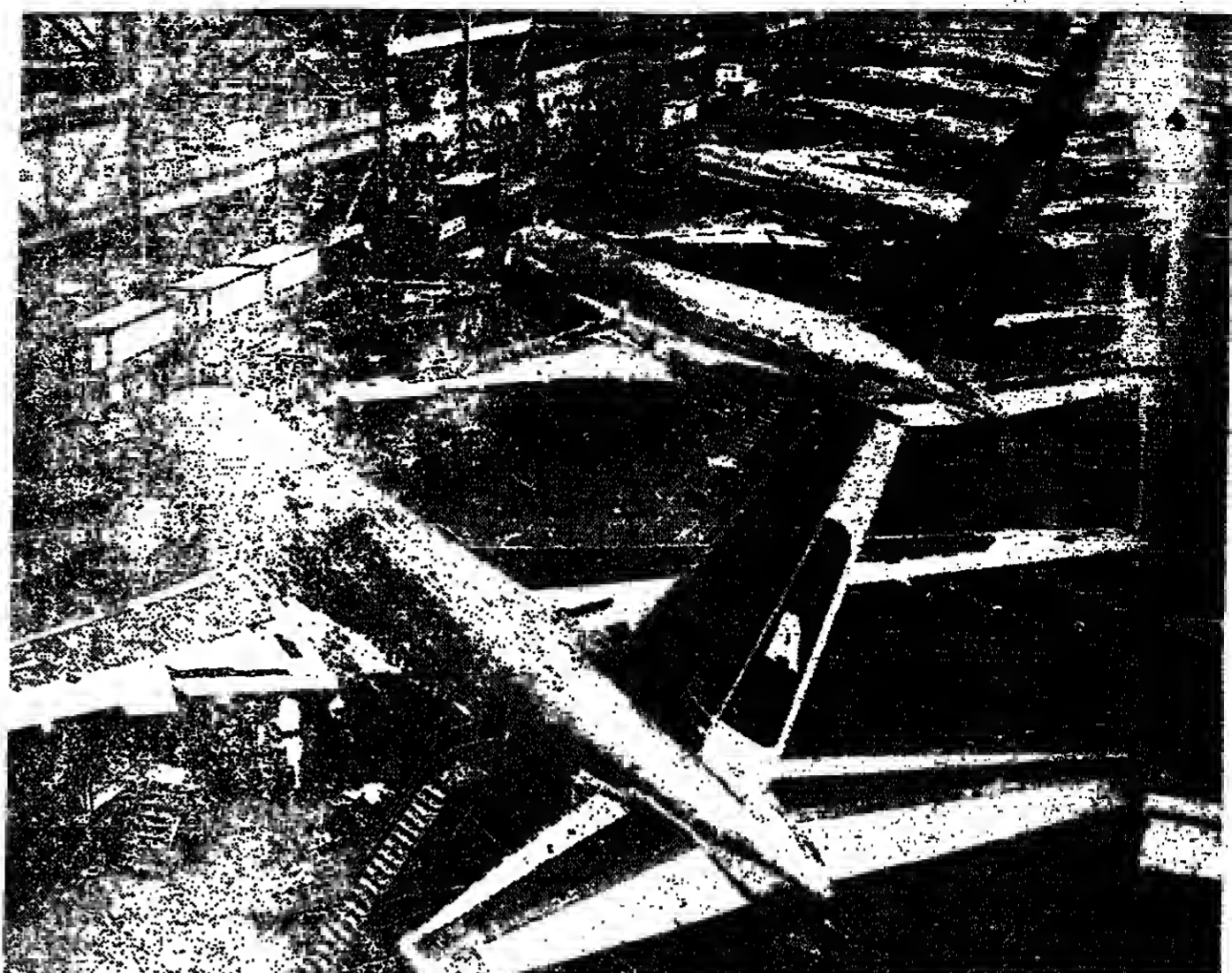
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Boeing 747 jet airliners seen in production at the company's Everett, Seattle, factory where 747 Jumbo jets are also built. The 747 is one of several new types of jet airliner under development and in production by Boeing, the others being the 757 twin-engine aircraft; the new Series 300 version of the 737; and the "extended upper deck" version of the 747 Jumbo itself.

Surprises on all fronts

THE PAST twelve months have brought a series of significant and sometimes bewildering developments for the U.S. aircraft industry. No doubt the lights are burning late at night in the offices of the major manufacturers, as they piece together the likely prospects for future sales.

On the civil side, the final collapse of Braniff and, to a lesser degree, of Laker Airways, may have added some more unusable capacity to that ghostly air fleet sitting in the Californian desert, and elsewhere, but they have also checked to some extent the industry practice of virtually suicidal price cutting.

On the military side, the Reagan Administration's defence policies, and the success of the testing period of the Space Shuttle, all augur well for the future of the Aerospace Industry. Finally, the Argentine conflict has added a joker to the pack, by stimulating widespread debate inside the U.S. defence industry over its implications for a whole range of military and naval hardware and strategy.

The latest batch of results from the major U.S. airlines indicated that progress is being made towards a return to health. Pan American World Airways, which has been a cause of some nervousness ever since it was caught out by the first surge in oil prices in the post 1973 period, has cut its losses in half in the second quarter, and confirmed that it expects to be in profit in the current three-month period.

Similar trends are indicated by the other major carriers, and this will be good news for the major manufacturers whose order books for civil aircraft are not all that healthy at present.

But there is one warning note for the aerospace manufacturers, from the analysts of the industry, Goldman Sachs, the Wall Street investment house, is among those who warn that the route back to health for the prudent airline manager will be via further control and cutting of costs. It will almost certainly not be via seeking further funds for new aircraft to fly new routes.

The demise of Braniff and Laker stand as an awful warning to industry managers of the dangers of over-investing in capacity in the hope of capturing the traffic to pay for it.

The recovery in the airline business is still very fragile. Much depends on the general recovery in the general economic cycle in the U.S.—given that airline customers are mostly business travellers. Should the U.S. recession be slower than expected in turning round—and recovery has been postponed several times—then some major airline names could be back in trouble quite quickly.

Also unsettling the future for the

industry, and therefore for the aircraft builders, is the outlook for world oil prices. The fall in prices in the early part of the year was a major factor in improving airline costings, and any reversal of the trend would have the same effect on the opposite side of the scale.

But on the labour front, the airlines appear to have more factors in their favour. The failure of the air controllers' strike is likely to have repercussions well beyond the specific wage claim involved.

Most airlines are seeking widespread changes in manning levels as well as pay structures. Once again, Braniff's collapse played an important role as well—by leaving many highly qualified airline staff looking for work outside the industry—fast food franchising seems to be a favourite.

The analysis of the industry tend to be in two minds. On the income side, passenger revenues now look more secure than a year ago, and on the cost side, both oil and wages seem to be going in the right direction—for the airlines, that is.

But competition is still fierce, especially around Dallas, where the Braniff traffic is up for grabs, and any serious

those companies already well into the more directly military defence budgets. It will also bring growth to the Space Shuttle consortia which include such names as Aetna Life and IBM.

Some of the military spin off has already shown itself in the shape of \$24m and \$4m modifications to Cape Canaveral and Mission Control at Houston respectively, for the increased security required by the Defence Department.

The outcome of the Senate's vote last June on the National Budget is expected to be a rise of 31 per cent in military procurement spending in the current year. The budget authority figure for defence may reach \$218bn this year, and rise to \$232bn in 1983.

Lockheed, which has become a purely military contractor since it discontinued the L-1011 commercial aircraft, is well placed in defence by virtue of its monopoly of construction of the intercontinental ballistic missile in its sea-launched form.

It is also strongly placed in overseas military sales, which are a likely area for further expansion. With these programmes still active, Lockheed is unlikely to suffer from the Senate's opposition to the C-5 project.

A major growth area for military aerospace lies in the field of aircraft electronics surveillance where the Middle Eastern and South American countries are keen buyers. The Sikorsky Helicopter, made by United Technologies, and the aircraft surveillance systems sold in Europe by the smaller U.S. defence companies are proving increasingly attractive to countries not necessarily in the big financial league.

This trend has been strengthened by the Argentine conflict which showed only too clearly the effects of such relatively cheap equipment as radar surveillance and heat seeking missiles on large targets such as warships.

Defence spending should ensure a firm future for the aerospace industry this year and for some years ahead. The benefits may not be spread equally throughout the industry, but few of the major companies will be without a share of the take. The smaller electronics defence manufacturers, like Loral of New York, or Wyman-Gordon or Hexcel, all with major shares in specialised markets, may outshine some of the better-known names.

If orders from the commercial airlines also take off in the mid-eighties, and there certainly is an "if" in the case just now, then there could be some spectacular gains by such companies as McDonnell Douglas with a foot in both camps.

Terry Byland

UNITED STATES

downturn in business could bring more grief. Whatever happens, the airlines are not likely to borrow money to buy aircraft if they can possibly manage without them.

Unfortunately, order books for new commercial aircraft are already looking thin. Pan American, for instance, has nothing scheduled for delivery next year, and neither has Continental, which is now effectively merged with Texas Air.

Both Eastern Airlines and Delta have orders in the pipelines for Boeing 727s and 737s, but the rest of the picture is rather bleak. In 1984 and beyond, the order books appear stronger.

But turning to the opportunities for military sales, the outlook is much more favourable. The success of the Space Shuttle testing in May was of dual significance to the aerospace industry.

The likely benefits of the \$6bn budget of the National Aeronautics and Space Administration for space-related activities have been well discounted inside the aerospace industry. But the latest good news is that the Defence Department's budget for similar activities now exceeds NASA's at \$8bn, and is still climbing.

Future space missions will be well backed by defence spending and this will clearly increase the flow of dollars to

month, the first commercial launching of the largely French-backed rocket Ariane, Europe's rival to the Space Shuttle.

But this sunny picture has come to be overshadowed by some big questions. First among these is the impact of the depression in civil aviation, coming at a time when the French authorities would like to see the military side of the sector playing a less preponderant part.

In the co-operative programmes which have been given both to Airbus and Ariane, there is the question of the next generations, still to be solved.

There is the question, too, of whether the momentum of European collaboration can be regained; Gen Jacques Mitterrand, Aerospatiale's chairman and head of the industry association Gifas, has expressed concern about the lack of new programmes.

Finally—another issue raised by Gen Mitterrand, as a challenge to his elder brother in the Elysée Palace—there is the question of whether French manufacturers can remain competitive.

FRANCE

AIRBUS, Mirage, Exocet. These three magic words alone are enough to conjure up the recent success story of France's aerospace business. For all the problems hitting airlines these days, the mood among French manufacturers is still fairly buoyant.

With a growth rate of some 10 per cent in real terms to show for last year, aerospace is one of the rare industrial sectors in France to have continued being a source of increased employment. Foreign orders rose by 30 per cent in 1981, and exports—mostly military—make up more than half of total turnover.

Aerospatiale, the biggest manufacturer, has taken over from Renault as the profit-making showpiece of the French nationalised sector.

While the ill-fated adventure of Concorde comes to its close, new status symbols have arrived to replace it: the first French cosmonaut, who took part in the three-man Soyuz 78 mission earlier this summer, and, next

The State's role in the industry has been considerably reinforced since the Socialist took power last year, with its share in Dassault-Breguet being increased to a majority and Matra, the missile specialist, as well as the Thomson-CSF communications group, being brought under state control.

More recently, Aerospatiale has been given the senior role in a regrouping of equipment suppliers. The private-sector Couzet and the public-sector Sema were concerned in two previous link-up plans in the last 10 years, but neither of them came off.

Under the new plan, backed by the Ministry of Defence, Aerospatiale emerges with the controlling shareholding in Sema—keeping it in the public domain—and almost 30 per cent of Couzet.

Aerospatiale's sales of FFf 16.5bn (\$2.4bn) last year accounted for 38 per cent of the whole industry's turnover. With its order book now amounting to almost three times that sales figure, a further big increase is expected this year, and the company is confident of staying in profit.

But not everything is rosy. Its highly successful helicopter division, for one, is especially vulnerable, since it exports 50 per cent of its production and relies heavily on the U.S. market.

One new civil aircraft project is already on the rails, the 42-10-49-seater "ATR 42," a high-wing turboprop being developed with Aeritalia.

First deliveries are scheduled for late 1983, and half a dozen companies have already placed provisional orders, including three from the U.S.

A decision on the next Airbus, which the French partner had hoped for by the summer, is still being awaited, however. The wide-bodied Airbus—the A300, already in service and the new A310, which is under going flight tests has made big inroads into non-U.S. markets and the venture appears to be well on its way towards paying for itself.

But much will hang on timing the launch of the 150-seat A320, the short-medium range aircraft which has become the priority project at

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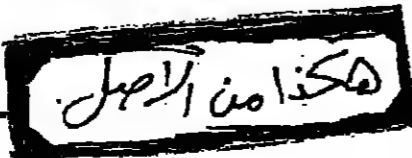
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Military programme cushions impact of recession

ACTIVITY in Britain's aerospace industry remains at a high level. Although the world-wide business recession has damped demand for civil products, military aircraft activity remains comparatively strong. While as a result of defence budget problems in the UK, West Germany and Italy, the production rate of the Tornado multi-role combat aircraft has been held down, it is still intended to build the full 809 aircraft and the programme will now take longer to fulfill than previously planned.

In other directions, work on the additional Sea Harriers to replace those lost in the Falklands war, and work on the 60 AV-8B Harrier (GR Mark 5) for the RAF and on the UK's share of the 538 AV-8B aircraft planned for the U.S. Marine Corps, is now beginning to make itself felt.

At the same time, much activity on both existing and new civil programmes is under way, with production of the BAe 146 regional jet airliner now increasing wing production for the A-300 and A-310 Airbus being expanded, and the prospect of work on the new A-320 150-seater version of the Airbus also looming.

The industry's vigour is reflected in the accounts of British Aerospace for 1981. This now partially denationalised aircraft, missiles and space group is the second biggest aerospace manufacturer in the Western World after the U.S., employing over 78,000 workers.

Last year, BAe's sales amounted to £1,666bn, against £1,428bn for the previous year, with exports accounting for over £1bn. The trading profit was £56m, and orders on hand at the end of the year amounted to close on £4bn.

During 1981, the UK industry as a whole achieved another new annual export record, with overseas sales estimated at about £2,6bn, compared with £1,79bn in 1980.

Although inflation played a part in this increase, the 1981 figure also reflected the high level of activity in various parts of the industry, especially in

the sale of spares for aircraft, engines and equipment programmes, begun some years ago and still generating substantial income.

Nevertheless, the industry has recognised the need for some new programmes in both the civil and military spheres, with which to keep factories busy when present work programmes mature and start to run down.

Although there is a heavy backlog of several years' work in the industry, on both military and civil (Airbus) account, with production of Airbus wings increasing to meet current commitments, the need for new programmes remains strong. Aircraft and engines take a long time to come to fruition from initial concept to operational service—sometimes as much as seven to 10

years—and in order to keep factories fully employed through the 1990s, the industry must start planning now, says a BAe spokesman. Four new civil aircraft types are now in an advanced state of development, with the possibility of at least three more under consideration. Those already moving through the factories include the 80-108 seat British Aerospace 146, four-engine regional jet airliner; the smaller, twin turbo-prop engine BAe Jetstream 31 "feeder" or "commuter" airliner; the Short Brothers Type 360 36 seat twin-engine feeder and commuter airliner; and the Westland W-30 civil helicopter. All of these aircraft are now flying.

The Jetstream 31 won its UK Certificate of Airworthiness during the summer, and deliveries to customers are now under way. The Shorts 360 is also nearing the end of its test programme, and is expected to gain its Air Certificate this September, with deliveries starting in November. Orders for the 360 stand at

27 aircraft for nine operators in seven countries, and production is currently running at two aircraft a month, with plans to raise this to four a month by 1984, if demand warrants.

The BAe 146, British Aerospace's biggest indigenous commercial aircraft investment programme, costing up to £350m, is also likely to win its Air Certificate by the end of this year, clearing the way for deliveries. So far, orders for the 146 stand at 10 aircraft firm, with another 12 on option, while production is building up to three aircraft a month.

The Westland W-30 is Britain's answer to U.S. civil helicopters, in what is expected to be a burgeoning market through the 1980s and beyond. The aircraft is already in service with British Airways in North Sea oil and gas industry support operations, and Westland is hoping for substantial orders in the years ahead.

So far, the recession has damped demand for these and other civil aircraft, British and foreign, but the UK industry hopes, as do other world aerospace industries, that when the recession ends, there is likely to be a flood of demand for these modern, more fuel-efficient and advanced technology aircraft, and that the factories will be kept busy for many years to come.

With an eye to the longer-term volume of civil business, British Aerospace is contemplating further improvements to two other of its current range of civil aircraft—the BAe 125 executive jet, and the BAe 748 twin-engine turboprop short-haul airliner.

While an extensive programme of improvements to the existing 748 is under way, the BAe is considering plans for a new, larger 60-seat version, called the Advanced Turbo-Prop, or ATP, with new engines from Pratt & Whitney to replace existing Rolls-Royce Darts (unless Rolls-Royce can provide an improved Dart itself).

For the BAe 125 Jet, the existing Series 700 version is selling well, but the group has been keeping in close touch

with market developments, and a Series 800 version could emerge in the not too distant future.

At the same time, BAe is studying the various options available in participating in the next major international airliner development, the A-320 150-seater planned by Airbus Industrie, the European airliner manufacturing consortium in which BAe has a 20 per cent stake, building not only wings for the A-300 and A-310 Airbus, but also having an overall design consultancy role.

The proposed A-320 is likely to be the most significant new airliner programme in Western Europe for the rest of this century, and for that reason alone it is considered by many to be imperative for BAe to win some share of it. The precise share in terms of financial investment and the amount and type of work to be undertaken by BAe, is still under discussion between that organisation and the rest of the Airbus team, with the UK Government, which will have to put up much of the launching investment, also closely involved.

The discussions, involving French, West German, Spanish and Dutch companies (and their governments) are complex, but it seems likely that they will be resolved around the end of this year. In the meantime, despite lack of enthusiasm on the part of the airlines for any new ventures in the current economic climate, design work on the A-320 is being pushed ahead.

Airbus Industrie realises that it cannot afford to allow the momentum of this programme to drop, especially with U.S. rivals such as Boeing and McDonnell Douglas waiting with programmes of their own to launch as soon as they judge the market climate to be right.

The UK is also especially prominent in the small "feeder" aircraft market. Apart from the BAe Jetstream 31, the UK has won a substantial niche in this market with the Short Brothers 330 twin-engine airliner, of which 111 have been sold to 34 airlines in 15 countries (of which over 95 have been delivered, including over 50 to the U.S.).

Since entering service in 1976, the 30-seat 330 has carried nearly 8m passengers, and flown over 325,000 hours. New versions of the aircraft on offer include the "Statesman" for business and executive travel, and a military utility transport model.

The bigger, 36-seat 360 is intended to be complementary to the 330, and it seems likely that it will also generate substantial sales in the years ahead.

Also busy in the small, light transport aircraft market is Pilatus Britten-Norman, of the Isle of Wight, builder of the Islander twin-engine and Trislander three-engine aircraft, which have enjoyed substantial success over recent years, with the company (now owned by Pilatus of Switzerland), having now sold well over 1,000 aircraft worldwide.

Michael Donne

BRITAIN

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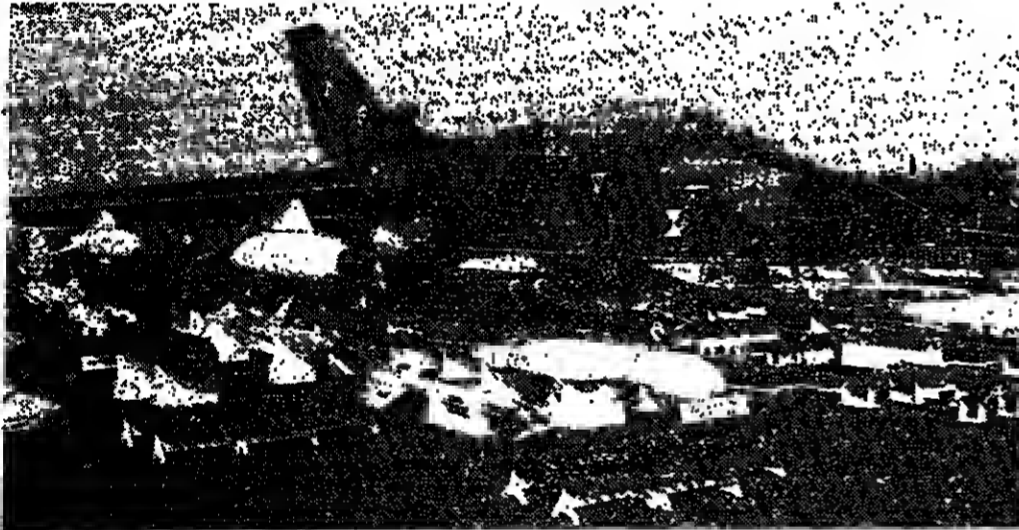
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Michael Donne



The Anglo-West German-Italian Tornado multi-role combat aircraft (above) is now in full production for the three countries, with an ultimate total of 809 aircraft envisaged

Greater emphasis on self-reliance

LIKE ITS counterparts in Western Europe, the West German aerospace industry is passing through a difficult period, with budgetary constraints affecting the level of government support, obliging the industry to place more reliance on its own resources, especially for the funding of new ventures.

Herr Martin Gruner, the state secretary responsible for the co-ordination of government aerospace policy, has made it clear that gaps caused by defence spending cuts are

not likely to be filled by government cash. As a result, the industry is turning its mind to ventures that it can support substantially by itself, although some government financial support will still be necessary.

The problems facing the industry are highlighted by the fact that Messerschmitt-Bölkow-Blöhm, which last year absorbed Vereinigte Flugtechnische Werke, is expected to shed about 4,500 workers by 1986, out of its expanded total, after the

merger of about 40,000, which at a time of peak post-war unemployment in Germany will be neither palatable nor easy.

Among the ventures which the industry would like to embark upon is the next version of the European Airbus, the A-320 150-seater, in which the industry is looking for a share of about 20 per cent. As with other partners, however, the eventual division of work and cost-sharing will depend partly upon how many participants are involved and

indigenous German combat aircraft, based on the original but now dormant TRF-96 concept.

This has resulted in a renewed effort to achieve international collaboration, and this summer there have been discussions on an industry level with the UK and Italy, to try to find ways of proceeding on a joint basis with at least the initial development of a European Combat Aircraft, based on the UK's P-110 design, if necessary with industry cash. Whether this comes to fruition remains to be seen.

Another major military programme hanging fire is the PAH-2 anti-tank helicopter, a Franco-German (MBB-Aerospatiale) venture which it is planned should enter service in the late 1980s. But a procurement decision is still awaited from the German Army, (which wants over 200 aircraft), and in the meantime, there is considerable competition from U.S. helicopter manufacturers, especially Bell, which is offering its Model 249.

Other ideas for the longer-term development of a new transport helicopter, the TH-3, have been proposed, with suggestions that this might form the nucleus of an eventual European-wide helicopter consortium between the West Germans, French, British and Italian manufacturers. This appears to have been pre-empted to some extent by the UK and Italian decision to go ahead with the EH-101 Sea King replacement, with the parallel development of a commercial variant, so that unless West Germany were to join that consortium (the French show little inclination to do so), the likelihood of any pan-European helicopter manufacturing group seems remote.

M. D.

France CONTINUED FROM PREVIOUS PAGE

Airbus, to meet fleet renewal needs and to compete with Boeing in this potentially huge market.

The in-service date of 1986 which the company originally had in mind now has to be re-considered. But progress has been made on putting together a new consortium, with a memorandum of understanding which would bring in De Havilland of Canada as the first non-European Airbus partner.

For Dassault-Breguet, which had a less impressive profit record last year despite a 16 per cent increase in sales to FRF 12,5bn, a lot depends on the success of the new Mirage 2000, the latest in the line.

The company's Falcon business jets helped to take up the slack last year when military sales were slow, but this year the civil side of the business is expected to do less well.

The 2000, a multi-role delta-wing fighter due to be produced in single-seater and two-seater versions, is to be ready for delivery from next year. Two important export deals have already been clinched, with Egypt and India, but an early disappointment in Australia was repeated this month when Belgium expressed its pre-

ference for the U.S. F-16—much to the annoyance of French officials.

The manufacturer is to put more muscle into the aircraft by fitting it with a more powerful version of the Snecma M53 engine.

The state-sector Snecma, which had consolidated 1981 sales of FRF 6.4bn, still relies on military orders for more than three-quarters of its engine sales, even though its civil orders—boosted through its joint venture with General Electric of the U.S., CFM International—practically doubled last year.

Overall, the industry's exports are almost two-thirds military, and it relies heavily on France's own defence spending programme.

After the Socialists came to power there was talk of correcting the balance and keeping the military side at 50 per cent, through new passenger aircraft projects and development of space activities. But, asked whether such an aim was ever serious, Government industrial strategists now shrug their shoulders.

David White

WEST GERMANY

partly on how much cash the Government will be prepared to inject into the venture.

According to Mr Bernard Lathiere, president of Airbus Industrie, the A-320 is already "over-subscribed," with enough potential participants to build at least 130 per cent of the aircraft, and it is likely that the West German industry will not get all that it would like to have. The Government's view is that while it favours continued support for the Airbus, the industry must earn that support by becoming more cost-effective in its activities. Moreover, the Government is anxious to see firm launch customers for the A-320 as a condition of sanctioning any additional support—a view that is close to that held by the UK Government.

Another new venture still under consideration is the next generation European Tactical Combat Aircraft. It is now clear that, at a time when the Tornado production line in West Germany has been slowed from 60 to 42 aircraft a year, because of budgetary problems, the Government has few, if any, funds to spare for the development of an

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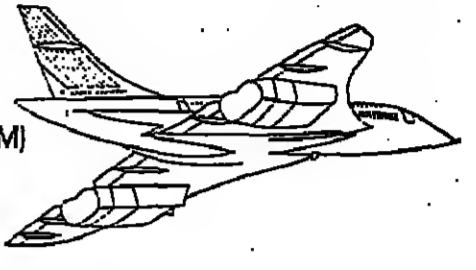
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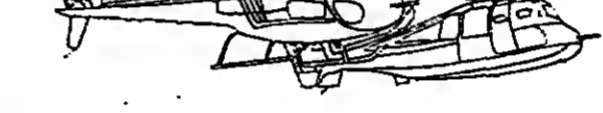


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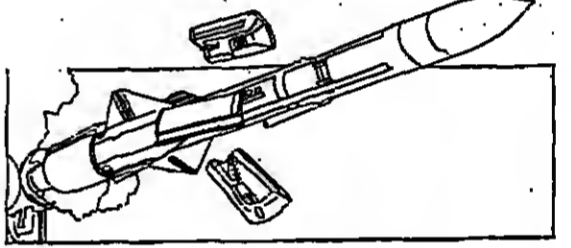
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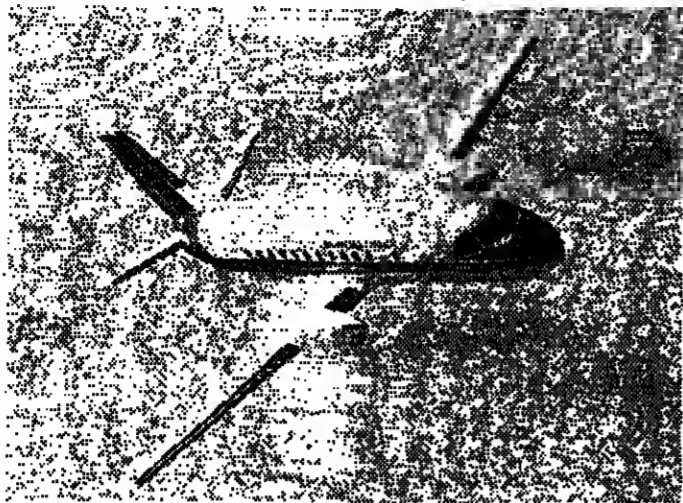
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Boost from new military contract

SWEDEN'S aerospace industry is basking in a far more buoyant climate these days. After three years of doubts about its future and with its very survival at stake the industry has recovered its self-confidence; new staff are being recruited and a sense of purpose has returned to the design rooms and workshops.

The most important single factor for this change of mood was the signing on June 30 last of the contract under which the all-Swedish industrial group led by Saab-Scania will build a new multi-role combat aircraft for the Swedish Air Force. Other bullish features are the speed at which Saab's joint airliner project with Fairchild of the U.S. is going ahead and the extension of the missile programme.



The Saab-Fairchild 340 commuter airliner, now in production, is a joint venture by Saab-Scania of Sweden and Fairchild Industries of the U.S.

The order for the new combat aircraft, code-named JAS, covers development and production of an initial batch of 30 aircraft. The contract is valued at about SKr 10bn (€140m), with about two-thirds of the work being carried out by Saab-Scania. The rest is divided among Volvo Flygmotor, the Ericsson Telecommunications group which will be responsible for the pulse doppler radar equipment, SRA Communications and FFV, the state-owned defence equipment manufacturer.

The full JAS programme approved by the Riksdag (Parliament) calls for the delivery to the Air Force of 140 aircraft with weaponry and other equipment by the year 2000 at a cost of SKr 25.7bn in 1981 prices. By choosing the JAS and discarding competing offers from American manufacturers, the Swedish Government and Parliament are estimated to have saved 6,000 of the 13,000 jobs within the Swedish aerospace industry. In particular Saab-Scania's capacity to design its own aircraft has been preserved.

The decision to go ahead with the JAS was pushed through Parliament by the non-Socialist parties against the opposition of the Social Democrats who are well placed to win the general election in September and return to power. The Social Democrats did not object to the contract but wanted to postpone the de-

cision for another year to allow time for further assessment of the economic and technical contents of the package offered.

The Social Democrats' attitude has been influenced by the doubts expressed by the Army commander General Nils Skold whether the JAS design has the development potential to remain competitive through its estimated lifetime, which will extend well into the next century.

The Air Force does not share the Army chief's reservations and the Social Democrats are not expected to cancel the JAS order if they are voted back

SWEDEN

into office in September. The contract signed in June provides for substantial penalty payments to the contracting group in the event of a cancellation.

It also includes penalties payable by the contractors if they fail to meet the specifications, which cover not only the aircraft's performance but also the cost of operating and maintaining it. Aiming at avoiding the cost overruns experienced in developing and building the Saab Viggen, the aircraft currently serving with the Air

Force, the contract significantly increases the risks carried by the contractors.

Saab-Scania emphasises that the JAS will be the first true multi-role aircraft, of which one version will perform intercept attack and reconnaissance missions. Like its predecessors, the Viggen and the Draken, it is designed to fit the special Swedish air defence profile which calls for planes able to operate from ordinary roads and under a simple turnaround service handled mainly by conscripts.

At a take-off weight of around eight tonnes the JAS will be roughly half the weight of the Viggen but will possess a weapons-carrying capability of the same order as its predecessor.

On the same day that the JAS contract was formally completed the Swedish Defence Procurement Board also placed a SKr 500m order with the Saab Bofors Missile Corporation, owned jointly by Saab-Scania and the Bofors armaments company, for an Air Force version of the RBS 15 missile currently under development for the Swedish Navy.

This brings to SKr 1.1bn the value of the contracts so far reached for the RBS 15. It is a sea-skimming anti-ship weapon similar to the French Exocet used by Argentina in the Falklands conflict. The only major

foreign component in the missile will be the jet engine, which will be bought from France's Micro Turbo.

The RBS 15 will have a longer range than Exocet. According to reports in the Swedish Press its target-seeking equipment will be less vulnerable to interference than that of Exocet and will have a ground-hugging capacity, enabling it to be used within the island belts around the Swedish coast.

Saab-Scania's target is to reduce its dependence on Swedish military contracts and to reach a balance between military and civil work by the end of this decade. The principal component in this strategy on the civil side is the 34-seat airliner the SF340, which it is building together with Fairchild Industries of the U.S.

So far development of this aircraft is on schedule. On August 3 at Saab's Linköping plant, the wings built by Fairchild in the U.S. were mated with the fuselage of the first aircraft, which is scheduled to roll out late in October next. The first flight will take place early in 1983 and the first deliveries are planned to reach customers in the first quarter of 1984.

Saab-Scania and Fairchild report 111 firm orders and paid options for the SF 340, which is aimed at the growing short-haul regional airline market. They estimate that the project will break even with the sale of around 200 aircraft at a price of roughly \$4.75m each in 1981 prices but they believe they have a good chance of capturing a considerably larger share of the market which could amount to as much as 2,000 aircraft by the mid-1990s.

One sales point underlined at Linköping is that by virtue of its transatlantic parentage the Saab-Fairchild SF 340 will be the first airliner designed to meet both the highest U.S. civil aviation standards and the new joint European aviation regulations. But one of its biggest advantages in fighting for its market share may be the speed with which it is being brought into production.

William Dullforce

Two countries become partners...

THE SPANISH aerospace industry continues to capture round the success of the C-212 Aviocar—or "the jeep with wings" as it has become popularly known. This STOL aircraft (short take-off and landing) has become the standard-bearer of its producers, Construcciones Aeronauticas (CASA) which, in turn, is the dominant force in the industry.

According to Casa a total of 330 C-212 aircraft either in civilian or military versions have been ordered and 213 are currently operational. Sales last year alone totalled 65 with new markets in Australia and the Emirates with a further breakthrough in all important North American markets, where 26 were sold. Aviocar orders assure Casa work for 1985.

Casa is also bidding for a major contract with India to supply 200 Stal aircraft offering the C-212. This would be a major advance and open Casa's horizons even further.

The Aviocar can carry up to 23 passengers or loads of 23 tonnes, with a wide variety of civil and military uses. The aircraft has done especially well on the military side and Casa is now stressing recent studies which have shown that peace-time use of larger military transports is well below capacity.

The argument now advanced is that it is cheaper and more efficient to utilise smaller aircraft of the Aviocar type rather

than, say, the Lockheed Hercules.

Work is now at an advanced stage on the production of an upgraded version of the Aviocar, the CN-235. This will be able to carry up to 40 passengers using a different and more powerful engine, the General Electric CT7-7 against the Aviocar Garrett TPE-331. The potential market for such an aircraft is believed to be

SPAIN

1,800 civilian units over the next 10 years, with a further 600 on the military side.

There is going to be tough competition from at least three other international groups. Casa feels it has acquired client loyalty as a result of the C-212 and it has made an important move to secure a foothold in the Asian market.

The company has signed a joint production deal with the Indonesian National Aircraft Company for the CN-235. The latter is already assembling the Aviocar and some 40 Spanish engineers are now working in Indonesia on the new project.

Casa, founded in 1923, is 69 per cent controlled by the state holding company, INI. Although one of the smaller European aerospace companies it has been remarkably successful largely because it has carefully

defined its objectives. Lacking a broad technological base and possessing limited funds, Casa has confined itself to filling the holes left by the major companies. At the same time, it has sought to develop an increasing share of Spain's defence needs in the aerospace sector.

One of the holes left by the big companies concerns adaptation of technology. Here Casa—which also has as partners Northrop (13 per cent), MBB of West Germany, (11 per cent) and Avions Marcel Dassault of France, (0.6 per cent)—believes that it can play a role adapting advanced technology to less sophisticated needs.

Casa also plays an important role as sub-contractor on a number of aircraft programmes. For instance, it makes horizontal stabilisers and passenger doors for the Airbus A-300 (it is also a member of Airbus Industrie); it supplies parts for the Mirage F-1 and for the Falcon executive jet, both produced by Dassault. The company also works with Boeing on the 727 and the 737 airliners, with McDonnell Douglas on the DC-10 and Canadair on the L215 programme, in addition to producing the BO-105 helicopter with MBB.

On the national defence side, Casa has developed and produced a jet trainer for the Spanish Air Force—the C-101. So far, four of these two-seat trainers have been delivered

and 100 ordered. Casa has high hopes of securing export orders for the trainer, especially in Latin America.

The company has a contract with the Defence Ministry for repair and maintenance of aircraft and also does some maintenance work for the United States Air Force on Phantom F-4 aircraft and their engines.

The most significant aerospace deal in years, however, has been the recent decision by the Spanish Government to select the U.S. McDonnell-Douglas F/A-18 Hornet fighter for the Spanish Air Force. Up to 84 aircraft will be bought, worth about \$3bn.

The deal—the details of which are now being discussed—will involve a substantial volume of industrial offset activity for the Spanish aerospace industry, including manufacture of components, the transfer to Spanish industry of U.S. aeronautical technology, provision for in-service maintenance and other support for the Hornet.

The deal also includes procurement of the U.S. General Electric F-404 turbo-fan engines to power the F/A-18 aircraft. A total of about 180 engines will be provided by General Electric for the new Spanish Air Force fighter between 1985 and 1988. The first Spanish F/A-18 is to be delivered in January 1986.

Robert Graham

...in joint "flying jeep" development

INDONESIA'S aerospace industry revolves around the personality of the Minister for Research and Development, Dr B. J. Habibie, and on the hopes placed on a new generation STOL (short take-off and landing) commuter freighter, the CN-235, which is being produced by an Indonesian-Spanish consortium.

Dr Habibie is also the President of Indonesia's public aerospace company, P. T. Nurtanio, and executives of Spain's CASA, Nurtanio's partner in the CN-235 project, speak of him in terms approaching reverence.

A hand-picked, bright-boy sent to study abroad, Dr Habibie gained a doctorate in aeronautical engineering in West Germany and joined MBB where he rose to become vice-president. He returned to Indonesia convinced that technological advance was the key to development and national independence.

His creation of Nurtanio, in the wake of the 1973 oil take-off, and under the umbrella of Pertamina, the state oil company, was a practical expression of his development theories. CASA executives see Dr Habibie almost as a renaissance figure equally at home in the worlds of advanced science, develop-

mental politics and complex administration.

After experimenting with the manufacture of a light Polish aircraft for agricultural use, Dr Habibie narrowed Indonesia's aerospace industry requirements down to co-operation, initially with his former company MBB, for the manufacture of the light, tactical BO-105 helicopter and later sought an agreement with Aerospatiale of France for the manufacture

INDONESIA

of the robust Puma range of helicopters. In the fixed-wing sector, Dr Habibie's choice of a Nurtanio partner was Spain's Casa.

Casa's first Indonesian contract for eight C-212 Aviocars in 1975 was followed by four further orders of 20 aircraft each with an upgrade of Indonesian participation in each order. The current 20 units of the fourth order are 85 per cent manufactured in Indonesia.

Casa executives attribute their relationship with Indonesia as much to the versatile, sturdy qualities of the "jeep with wings" as to the flexible

nature of the Spanish company itself.

Both Spain and Indonesia found fertile common ground in the department of intermediate technology and of a national aerospace industry. The first born of the marriage of interest is due in October, 1983, when the CN-235 is scheduled to make its maiden flight. Essentially, the 34-35 seat, high wing, turbo prop CN-235 is the child of the Aviocar, and shares the basic characteristics of its parent. It aims to be cheap both on fuel and maintenance, and is projected to be both tough, with a landing gear designed for semi-prepared airfields, and adaptable for both passengers and cargo. Its maximum cabin diameter is a spacious 2.7 metres, and it incorporates a wide central door and cargo ramp.

The aircraft will be powered by two CT7-7 engines and uses Messier Hispano-Bugatti landing gear.

The CN-235 is the result of a 50-50 Indonesian-Spanish shared basis project and \$90m has been sunk into its development and the construction of its two prototypes. Commercial feasibility studies estimate a civil market for the aircraft of 1,800 units, for the 1984-94

period, in addition to a further 600 adapted for military use.

Indonesia has placed orders for 54 units and Spain for 20. The test for the new aircraft inevitably depends on the American market for which the feasibility studies allocate 40-45 per cent of the estimate. The CN-235 backers believe that CASA has already achieved something of a breakthrough in America, having found five civil U.S. buyers for the Aviocar.

Production of the new aircraft aims to boost the present 6,000 employed in Indonesia's aerospace industry to a workforce of 10,000 by 1986 and to consolidate for Nurtanio an unchallenged position in South East Asia.

The conditions for such pre-eminence are already well-established at Bandung where factories Nurtanio One and Nurtanio Two (earmarked for the CN-235) constitute what foreign associates claim is an outstanding modern conception of facilities for an aerospace industry. In keeping with Dr Habibie's background and beliefs, research and development facilities occupy pride of place in the complex.

Tom Burns

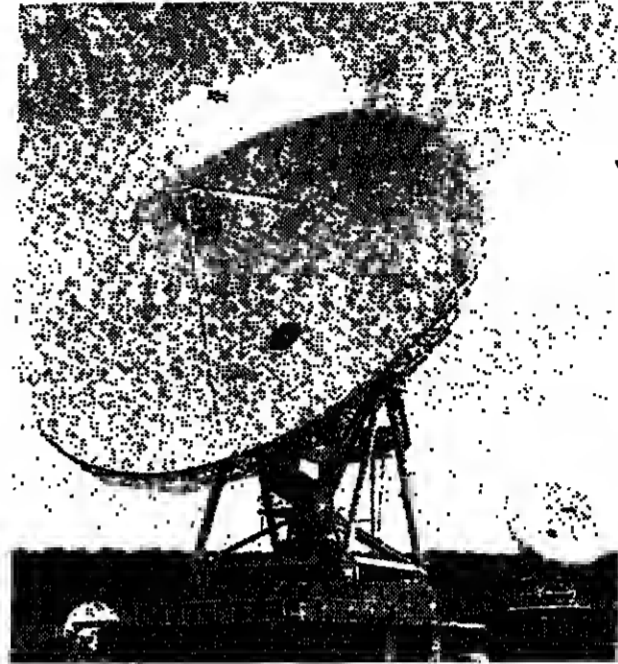
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THE BRAZILIAN aerospace industry is one of the most vigorous in the Developing World. It has already made a major contribution to world air transport with a range of small and medium-sized airliners and military trainers...

of the aircraft, while it is also in service with various foreign air forces. Following the Bandeirante, Embraer is now developing the larger 30-seat twin-engined...

Brazilian-built versions of Piper single-engined and twin-engined light aircraft. In the military field, Embraer has assembled under licence the Xavante, the Brazilian version of the Italian Aeromacchi MB-326GB jet trainer and ground attack aircraft...

Good opportunities for foreign manufacturers

SINCE its purchase several years ago of three Boeing 747 Special Performance Jumbo jets, China has done little further to upgrade its aged fleet of passenger aircraft...



China has attempted to build a supersonic aircraft of its own, driven by Rolls-Royce Spey engines, but it has either cancelled for the time being or abandoned the project altogether.

CHINA modernising its airline, known as the Civil Aviation Administration of China (CAAC). Boeing has been most active in seeking to drum up aircraft sales in China and probably has the inside running if and when the Chinese decide to replace some of their ageing Soviet-built Ilyushins and Antonovs...

The prototype 17-passenger twin-engined Y-11T transport aircraft, built at Harbin in China. DK Aviation of the UK will be responsible for world-wide marketing, through a company to be set up in conjunction with the China Trade Centre.

China has expressed an interest in acquiring the Sea Dart missile system for its Lida Class destroyers. According to a British Aerospace representative in Peking, discussions have reached quite an advanced stage.

Advertisement for General Electric aircraft engines. Features a large image of an engine and the headline 'Aircraft engine innovations that bring technology to life: Tomorrow's advanced engines are on test, on time, on target. Today!'

Moves to overcome technology lag

JAPAN HAS a moderate but steadily growing aerospace industry. It does not produce thousands of Mitsubishis and Kawasakis to crowd the world's airlines like the Toyotas and Datsuns that Japan's bigwigs, next gross sales in fiscal 1981 (ending 16 March 1982) reached Y327bn (\$1.3bn).

Companies has 133 members. The Japanese admit that there is a technology lag. In the Boeing 767 project, they have been entrusted, only with production of body sections. In the military aircraft field under licence, the electronic gear must be imported from the U.S.

Advertisement for Israel Aircraft Industries. Features a photograph of an aircraft and the headline 'EXPANSION BY ISRAEL AIRCRAFT INDUSTRIES'. Text describes the Kfir (Lion Cub) single-seat interceptor and other aircraft.

Exports have risen dramatically

CANADA'S aerospace industry, divided about equally between Ontario and Quebec, with a sprinkling of plants further West, has begun to feel turbulence from the world recession. Those parts of the industry specialising in defence work, both components and overhaul, and in avionics and electronic systems generally, have managed to keep up volume and employment on the whole, while companies making engines and parts for the commercial aviation makers have felt a sharp down-draught.

The Canadian aerospace industry comprises about 125 companies which make aircraft engines, airframe components, satellites, electronics systems and components, including navigation and communication systems, flight simulators, hydraulic gear and fuel systems. They are located mainly in Montreal, Toronto, Winnipeg, and Ottawa, but also in the Maritime and Western Canada. The two largest employers are: Canadair, of Montreal, which makes the Challenger business jet, a water bomber for firefighting, and also airframe components and defence products; and Pratt and Whitney Aircraft of Canada, the world's largest manufacturer of small turboprop and turbofan engines for the general aviation industry. De Havilland Aircraft of Canada, at Toronto, which makes the Twin Otter, the Dash Seven, and is now developing the Dash Eight, both commuter-type aircraft with Pratt and Whitney engines, is next largest.

Canadian Marconi specialises in navigation systems and

avionics, and CAE Industries is a world-class producer of simulators for commercial airliners and military aircraft. A host of firms in Montreal, Toronto and elsewhere specialise in other areas of aerospace. The industry had a volume of about \$3.3bn in 1981, even after inflation twice the level of 1976, and employment in the same period rose from 25,000 to 45,000. Exports have risen dramatically. The ratio of exports to total sales was 76 per cent in 1976 and 88 per cent in 1981.

CANADA

1980, mainly due to engine and component work.

Aerospace is Canada's only secondary manufacturing industry with a long term favourable balance of trade. Despite the impact of the present recession, sales are expected to double again by 1986, as the Challenger deliveries peak. Mr John H. Simons, chairman of the Air Industries Association of Canada, believes that this successful record has come about because of the industry's determination to specialise, undertake more research and development with Federal Government help, take commercial and military aircraft component work, and find world markets for the Challenger wide-bodied business jet and the two de Havilland commuter aircraft.

The successes of the past decade, including the Canadian "space arm" on the American

Space Shuttle, have been costly both for individual companies and Government financial resources. Generally, the industry remains modestly profitable, but the Government, besides its direct funding of research, has guarantees outstanding for about \$1.2bn in Canadair debt to cover development and production of the Challenger. Further heavy backing, has been provided to de Havilland Canada for the commuter aircraft and for engine development at Pratt and Whitney.

The two main problem areas, as a result of the recession, are Pratt and Whitney, the engine maker, and the two airframe firms, Canadair and de Havilland Canada, which are both Government-owned.

Pratt and Whitney has had to lay off around 2,000 workers as demand from the U.S. general aviation industry has plummeted nearly 50 per cent in the past year.

New orders

U.S. small aircraft manufacturers comprise its principal market. Canadair's Challenger programme has taken much longer than expected and a second version, with more powerful engines, had to be developed to meet full market expectations for the aircraft. There have been some stretch-outs in deliveries because of the recession, and costs have been affected by inflation. The company has made some minor layoffs this summer, and could have to make more.

While de Havilland's order book for the twin-engine Dash Eight commuter airliner has

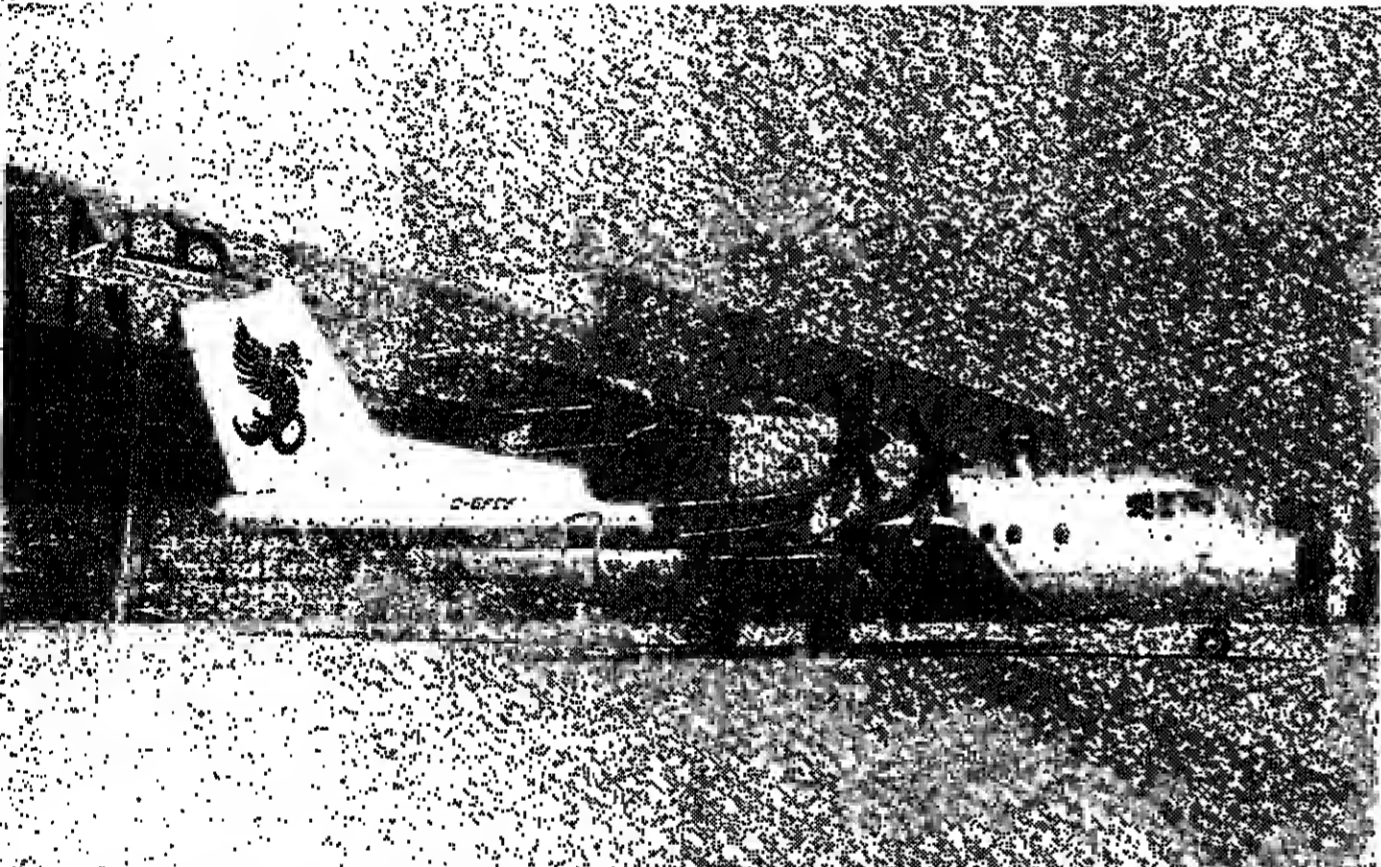
swollen to about 110, or about one-third of the way to estimated break-even, and production will start only in the fall, the four-engine Dash Seven has been a disappointment, while orders are running light for the older Twin Otter, widely used in the resource industries.

However, de Havilland Canada, with the support of the Government, has signed an understanding with Airbus Industrie of Europe to participate in development of the A-320 150-seat airliner, and to make airframe components for it. The Government would invest about \$500m in the project, and would expect to gain at least 10 per cent of the manufacturing programme with de Havilland Canada as an associate partner. The possible entry of Canada into the A-320 programme is now being hotly debated inside and outside the industry, and domestic politics are involved because the Government wants a new aircraft plant in Quebec.

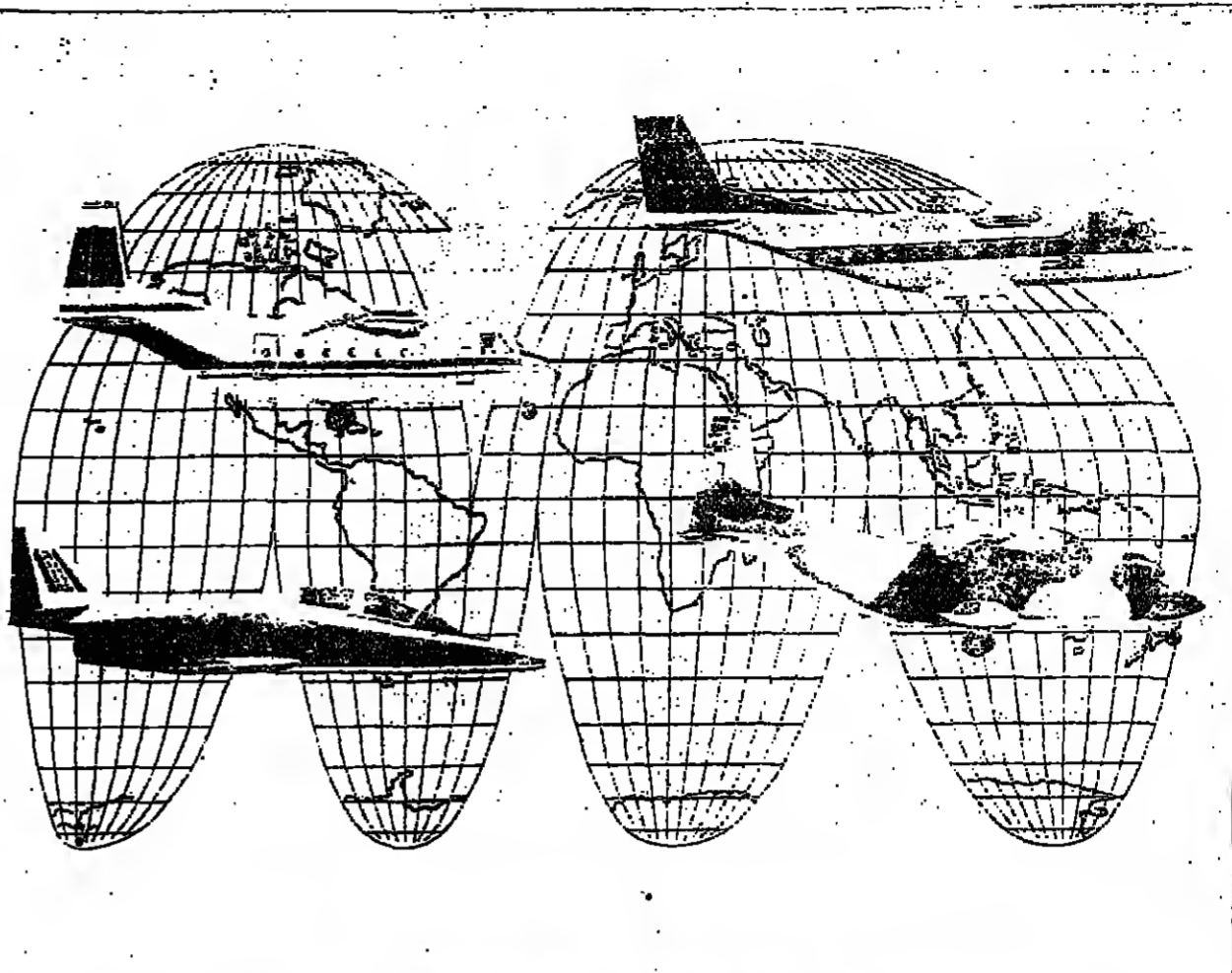
No final decision on Canadian participation is likely for at least a year, because of the uncertainty whether enough of the world's airlines will be able to afford the required number of A-320s for the project to get off the ground.

Air Canada would be expected to become an A-320 customer, and it will have to replace its DC-9s at some stage. Another factor will be the future of Boeing's rival "7 Dash 7" project, and a comparable venture from McDonnell Douglas of the U.S.

Robert Gibbens



The four turbo-prop engine de Havilland Canada Dash Seven airliner has sold widely throughout the world both as a commuter and feeder-airliner and as a general duty transport. A feature of this aircraft is its short take-off and landing capability



CASA SPREADS ITS WINGS AROUND THE WORLD

Its Wings? Today CASA's wings are the CASA C-212 Can Conquest, the CASA C-212 Military Transport, and tomorrow the CASA C-212X, the next generation transport.

In the world of commuter aircraft, the 1970's saw the C-212 take off. Right now there are more than 320 of these versatile multi-mission aircraft in service in some 25 countries. Built to the stringent requirements of the U.S. FAA part 27, the C-212 performs equally well as an airliner, as a freighter, or a combination of both.

The work of aviation in the 1970's, 1980's and beyond will see the introduction of our new all-weather transport, the C-212X, called the C-212X. This new transport draws heavily on the success of the C-212, and is also built to meet FAA part 25 requirements. With its 2,000 hour airframe life, the C-212X is intended to be the premier aircraft for a combination of operations well into the 21st century.

In the world of military aircraft, there's the CASA C-212 military transport, the most modern turboprop delivers the lowest life cycle cost of any

operational airliner. It can stall in mid-air, right landing, and have full strength through landing gear and into its most advanced operational unit, including weapon delivery. The C-212 can also serve as a light transport aircraft for close support.

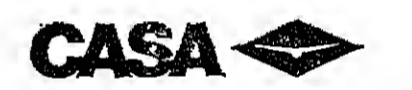
In the world of military transport, the C-212 has been performing a mission for more than a decade. It is used to transport troops, drop military personnel, transport of supplies, evacuate wounded, or operate as a mobile search and patrol aircraft.

The C-212 with the C-101, the C-212X, the C-212 military, the C-212X, and the C-212X are the most advanced transport aircraft in the world. CASA was founded in 1929. Before developing its own aircraft, the company involved itself deeply in advancing the state of the art and technology of aircraft construction. So much so that in the year that followed CASA was employed by the world's major aircraft companies to contribute the kind of ideas and expertise that would establish a special reputation for CASA throughout the world as a manufacturer of aircraft designers and manufacturer of a reputation for

operational airliner. It can stall in mid-air, right landing, and have full strength through landing gear and into its most advanced operational unit, including weapon delivery. The C-212 can also serve as a light transport aircraft for close support.

In the world of military transport, the C-212 has been performing a mission for more than a decade. It is used to transport troops, drop military personnel, transport of supplies, evacuate wounded, or operate as a mobile search and patrol aircraft.

The C-212 with the C-101, the C-212X, the C-212 military, the C-212X, and the C-212X are the most advanced transport aircraft in the world. CASA was founded in 1929. Before developing its own aircraft, the company involved itself deeply in advancing the state of the art and technology of aircraft construction. So much so that in the year that followed CASA was employed by the world's major aircraft companies to contribute the kind of ideas and expertise that would establish a special reputation for CASA throughout the world as a manufacturer of aircraft designers and manufacturer of a reputation for



Industry 'reasonably confident'

LIKE ITS counterparts elsewhere, the Australian aerospace business is at present hardly blockaded with orders. On the other hand, despite recent budget cuts, the Australian armed forces are moving into a new round of major equipment acquisitions which will keep their own capabilities reasonably abreast of international standards, and should ensure continuing relatively good levels of employment for the local aerospace industry.

In general, Australia continues to rely on overseas sources for the design and construction of most of its larger and more complex weapons systems. At the same time, much has been done to harness local industrial resources to reduce Australian dependence on overseas manufacturers for the maintenance of this equipment.

The base of the Australian aerospace industry comprises three main organisations: the Government Aircraft Factories (GAF) and the Commonwealth Aircraft Corporation (CAC), which operate side-by-side at Fishermans Bend, in Melbourne, and Hawker de Havilland Australia, whose main base is Bankstown, Sydney. They currently employ just under 6,000—10 per cent more

than the bottom of the most recent work trough, in 1976—and have annual sales exceeding \$1,500m (£88m).

Since the Defence White Paper of 1976 spelt out a policy of increased Australian defence self-reliance, the Government's aim has been to bolster the local aircraft industry so it can provide independent support for all defence aircraft.

It is this maintenance support

AUSTRALIA

role which currently provides the local industry with the greater part of its defence work. CAC currently overhauls the Snecma Atar gas turbine engine for the Royal Australian Air Force's Mirage, as well as Rolls-Royce Avon and Viper turbojets. At GAF major maintenance activity is related to the Mirage, while Hawker de Havilland handles the maintenance work on the RAAF's Caribou aircraft, the Pilatus Porter for the Army, and Tracker, Wessex and Sea King helicopters for the Navy. In addition, Hawker has built up a substantial export business on gas turbine overhauls.

In the main, says Hawker's commercial director, Mr Peter Smith, defence manufacturing currently consists of spares and modification kits, though in the absence of significant defence manufacturing projects over the second half of the 1970s, the Government's AIP Programme (Australian Industry Participation) has been crucial as a potential source of manufacturing work.

For example, CAC has scored impressively in its major speciality, jet engines, winning sub-contracts for engine component production from Rolls-Royce, Snecma, Pratt and Whitney, and General Electric, as well as airframe contracts from Boeing, Lockheed and McDonnell Douglas.

The main beneficiary has been Hawker, with contracts from Bell, Boeing, British Aerospace, General Electric, Lockheed, McDonnell Douglas and Pratt and Whitney.

Despite the current recession in the international aerospace and aviation industries, Mr Smith says the Australian aircraft industry is looking to the rest of the 1980s with reasonable confidence.

This is partly because of new military aviation programmes currently in a formative stage, as well as the recognition that in the last few years the Australian industry has become more competitive internationally.

There is also a hope that Australia will eventually assume a role as the centre for advanced aerospace technology in the Pacific and South-East Asia.

A major boost to the local industry will be its participation in the RAAF's McDonnell Douglas F-18 fighter-bomber programme. Another will be the recent contract awarded to the Australian Aircraft Consortium (a joint venture between CAC, Hawker and GAF) for design and development of a new turboprop basic pilot training aircraft for the RAAF.

In June, the Australian Minister for Defence Support, Mr Ian Viner, announced the award of a \$336m contract to CAAC for a basic trainer, cover-

ing design, development, construction and flight-testing of prototype aircraft. Following successful and prototype development, further contracts are due to be awarded covering manufacture and flight-testing of 68 aircraft.

According to Mr Viner, production of spares and support equipment is likely to take total project costs to around \$315m, at August 1981 prices. The new aircraft, which is expected to enter service in 1988, will be the first manned aircraft since the 1950s to have been designed and built in Australia to meet military standards.

A third major project in the offing is Australian participation in the 150-seat Airbus Industrie A-320 airliner, though Canberra, as well as the Bell, Boeing, British Aerospace, General Electric, Lockheed, McDonnell Douglas and Pratt and Whitney.

Memorandum

Recently, a memorandum of understanding was signed by de Havilland Canada, which could potentially see the Canadians taking a 10 per cent stake in the A-320. A similar memorandum, involving around 2 per cent, was signed by the Australian aerospace industry last December, but in recent weeks a more formal offer has been received.

The feeling locally is that Australia cannot afford to subsidise the A-320 programme, and while the project is readily described as one of the brightest opportunities for the industry in the second half of the decade, it is felt the Australian Government will be unwilling to take up the proposal, as currently phrased, unless it specifically wants to do something about export prospects or employment potential.

Michael Thompson-Noel

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Most international airlines have incurred heavy losses in recent years and many continue to do so. Even the limited expansion now occurring in air travel is largely profitless—the revenue yield from the increased volume of traffic is not matching rising costs.

International airlines struggle for survival

DURING THE past two years, the world's scheduled airline industry has been passing through the worst economic recession in its history. The overall volume of world air travel, which through much of the 1970s showed an average annual rate of growth of about 7 per cent a year, slumped in 1980, according to the annual figures compiled by the International Civil Aviation Organisation (the technical agency of the UN). The total number of passengers at 748m was down 6m on the previous year—the first-ever fall and there was a further fall to 728m in 1981. Many airline executives, accustomed all their working lives to coping with the problems of over-rapid expansion, were faced with a slump and all its consequent problems—economic, industrial, social and managerial.

The industry in general has coped well with the crisis. Despite all the problems, few airlines have gone out of business so far (although this may be due less to the skills of their managements than to the desire of their bankers not to lose the heavy investments already made to them).

Reactions

Most airlines have incurred heavy losses, and many continue to do so. Managements' reactions have been to retrench hard, with heavy labour lay-offs, cancellations or deferments of new equipment orders, the grounding and sale (where possible) of older, less-efficient equipment, and the elimination of unprofitable routes.

It is now estimated by the International Air Transport Association that there are 150 wide-bodied and 200 narrow-bodied jet airliners for sale world-wide, equivalent to about 91 per cent of the world scheduled airline fleet in 1981. The pattern of the recession has been mixed. It has been worst in the U.S., where deregulation (with consequent fiercely increased competition) has compounded many of the economic difficulties already being experienced (contrary to some opinions, deregulation itself has not been the basic cause of those economic difficulties).

The recession has also hit Western Europe hard, but it

has had a far less severe impact on many airlines in the Developing World, although it has inevitably had some effect in reduced rates of traffic growth. Now, the industry is anxiously looking ahead, to see whether the recession is fading, as some observers believe. Over recent months, there have been some signs of an improvement in traffic volumes, although again this pattern has been mixed.

In the U.S., both domestic and international scheduled traffic showed a small rise during the first few months of this year. In the UK, the British Airports Authority has reported a small but consistent improvement in traffic over recent months.

Overall, it seems that air travel is improving slowly, and for 1982 as a whole, there may be a small recovery from last year's ICAO figure of 728m to about 742m, a gain of just under 2 per cent.

The problem confronting the airlines is that this is far too small a growth to be of much value, and that even this limited expansion is largely profitless—the revenue yield from the increased volume of traffic is not matching rising costs. Although fuel prices have stabilised in recent months, and in some cases have come down, other costs continue to rise, while the burden of interest payments on new equipment remains a serious burden. The gross revenues of the in-

ternational scheduled airlines are expected to rise in 1982 from last year's \$66.3bn to about \$70bn, but this growth is expected to be largely wiped out by the rises in costs.

It has been estimated by the IATA that the losses of its 117 member-airlines for 1982 are likely to amount to \$1.57bn, after taking account of about \$1.6bn in interest charges. This loss is likely to rise to 1983 to some \$2.1bn, after interest of \$1.73bn.

According to the IATA, interest rates are now taking over from fuel as the airlines' biggest single headache. While, remarkably enough, some airlines have reported profits in 1981-82, most others are still incurring losses (and British Airways is

a case in point), while some, such as Laker and Braniff, have gone out of business, and others may yet join them before the recession in the airline industry is over.

The interest rate problem is especially worrying. Mr Ray Copc, finance chief of the IATA, says: "We are in a loss area that we seem unable to get out of. By 1983, all financing will be by borrowing. The airlines are becoming hostage to the loan market. There will be more Laker and Braniffs by the time you get to 1984."

One of the most significant effects of this situation is that the airlines are virtually unable seriously to contemplate at present significant new orders for the generation of "advanced

technology" airliners they know they need. Those aircraft, with improved fuel efficiency, quieter engines, improved seating capacities and other benefits, could do much to help improve their overall financial situation, but they cannot afford to buy them just yet.

While a few orders are being placed with the manufacturers, the rate is substantially lower than in previous years. Moreover, most of these orders are coming from airlines in the Third World, where expansion has been less affected by the recession, and where governments are supporting the expansion of their airlines as instruments of political as well as economic policy.

Nevertheless, the manufacturers are holding on grimly in the anticipation that brighter times lie ahead. The general hope now is that there will be an end to the recession, or at least a dimming of it, by the end of 1983.

Whether this in fact occurs remains to be seen, but overall, both the airlines and the manufacturers hope that by the mid-1980s, the recession will be a thing of the past.

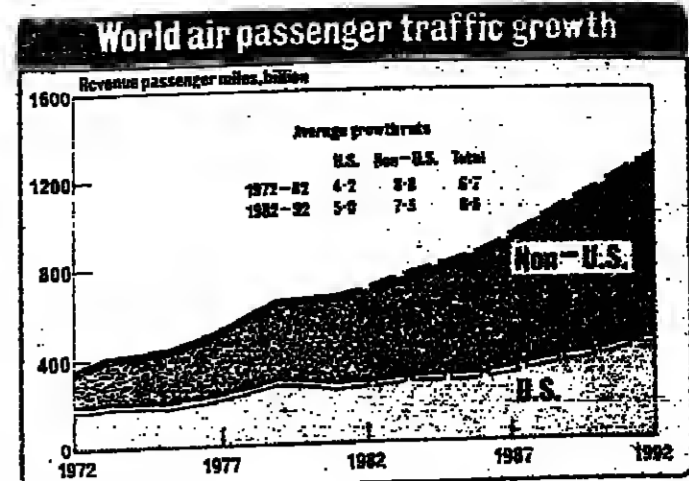
Reductions

The other major difficulty for the airlines is their current economic situation is that they are not able to make the widespread reductions in fares that they know are necessary in order to stimulate traffic.

They have seen what happens to airlines who sell their product—the airline seat—at less than production cost in order to generate a share of the market, and the situation in the U.S. of fierce fares cutting is widely regarded as a recipe for disaster—although no airline seems prepared to put a stop to it.

Outside the U.S. and especially in Western Europe, there remains a widespread pressure from some governments and many consumer groups for cheaper fares, but while the airlines do respond where they can in shaving fares and offering special promotional rates, the overall trend in fares remains upwards, if only to keep pace with inflation.

It seems likely that increasingly the airlines will have to reduce, if not abolish, many of the trimmings and luxuries of



World air passenger traffic is forecast to grow to over 1,200bn revenue passenger miles by the early 1990s, with most of the growth likely to occur outside the U.S.

airline service as it has been known in the past. Aircraft will become more crowded, there will be less leg room as airlines seek to squeeze in as many passengers as possible, and in some cases food service may have to be reduced in scale.

The airlines have paid considerable attention to the need to keep their passengers happy in a difficult economic situation, but in their present struggle for survival there is little they can really do to make their products as attractive as many of them would like.

What they can do, and are trying to do, is to improve the quality of service they offer in other directions. Overall, airline punctuality has improved in recent years although inevitably industrial disputes over which the airlines have no control (such as last year's air traffic controllers' disputes in the UK and U.S.) affect this situation.

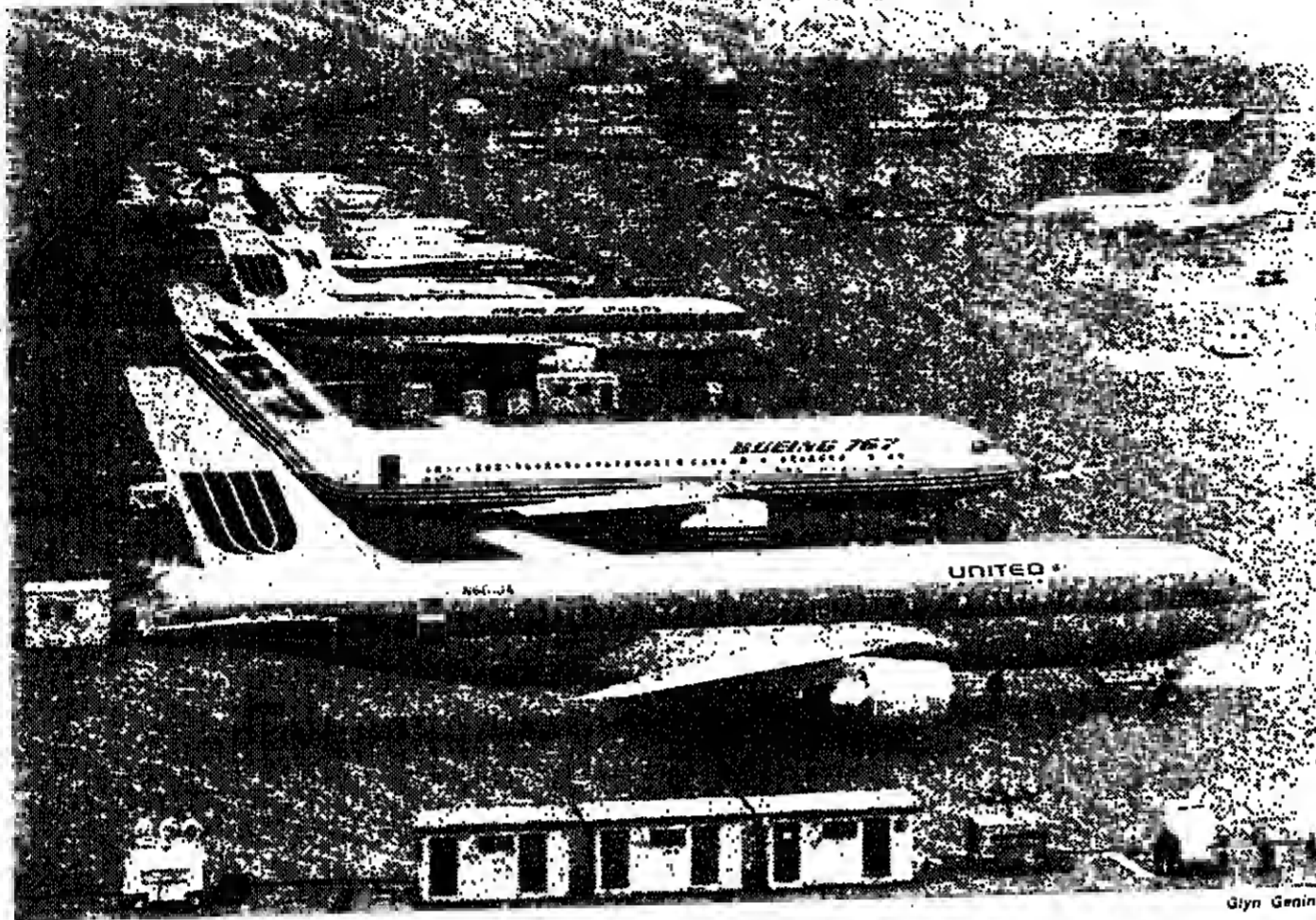
The overall safety record of the industry is also improving.

Although even one bad accident to a wide-bodied jet can significantly alter the statistics, figures issued earlier this summer showed that in 1981 there were only 355 passenger deaths compared with an average of 763 a year for each of the three preceding years, with only 12 jet airliner total losses in that year against an average of 21-22 for the three preceding years.

The world scheduled airline industry is thus coping with the recession. The industry that is likely to emerge at the end of it will be slimmer and tougher, with many of the wasteful practices of the past eliminated. Airlines will be better geared to take advantage of any improvement in the economic climate.

But even so, the heavy losses of the recent past will take years to wipe out, and the economic effects of the recession are likely to remain with the industry for a long time to come.

Michael Donne



The Boeing 767 twin-engine airliner on the flight line at the company's Seattle, Washington, factory. The aircraft is about to enter service with United Air Lines of the U.S.



Airlines have paid considerable attention to the need to keep passengers happy in a difficult economic situation.

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STAYING AHEAD IN THE RACE TO TOMORROW.

هكزان الأهم

CREDITS

Mexico granted a short but vital breathing space

MEXICO LAST week won a vital breathing space in its efforts to overcome debt problems, which, from the point of view of sheer numbers, constitute the worst the Eurocredit market has ever seen.

On Friday in New York over 100 creditor banks agreed in principle to a moratorium on all payments of principal on medium and short-term debt for a period of 90 days from the date of maturity.

This will give a space of over three months in which Mexico can complete its agreement with the IMF on credit facilities of over \$4bn. Last week it had also secured credits of \$2bn from the U.S. and was in the final stages of talks on a \$1.5bn credit from the central banks of the industrialised world.

In addition commercial banks are to average a \$300m to \$1bn additional loan for Mexico, but meanwhile Mexico itself will continue to meet interest obligations on its \$60bn public sector debt and service fully all its bond issues and other forms of non-bank debt.

All this will allow time for more talks to begin on a more permanent restructuring of the country's foreign debt, especially the massive \$17bn of short-term debt piled up over the past year.

It was already clear from the speed with which banks approved Friday's moratorium that the world's monetary authorities are prepared—because of the size of the debt—to exert strong pressures on the commercial banks to achieve a smooth solution.

But on Friday commercial bankers were still pointing out that tackling Mexico's debt problems will remain a delicate and complex affair. The \$60bn of public debt includes over \$3bn of bond issues, commercial paper and bankers acceptances as well as pure bank debt contracted with probably several hundred banks altogether.

Several feared that a three month moratorium may simply not prove long enough to deal with the problem completely and it may have to be extended. And meanwhile the aftermath of Mexico's problem is expected at the very least to redouble the restraint on lending to the whole of Latin America that developed after the Falklands Islands crisis.

A test of this could come quickly as it was on Friday too that terms were announced for a \$500m credit to be raised jointly by Venezuela's state electric utilities Edelca and Cadafé.

These provide for a maturity of eight years with four years grace and a margin of 1 per cent over Eurodollar rates. Venezuela is sticking to its refusal to raise money over the expensive U.S. prime rate.

It is not clear whether the loan will be brought to the market quickly. It is to be led by eight banks—Arab Banking, Bank of America, Bank of Tokyo, Chase, Lloyds Bank International, Mitsui, Ste Generale, and Sumitomo.

But a potential problem facing these banks in syndicating the credit is simply that available manpower in potential participant banks is now being heavily concentrated on assessing the Mexican position. There is little opportunity for decisions to be taken on other matters.

In economic terms there is scant reason for tarring Venezuela with the Mexican brush as it has very considerable foreign exchange assets, a tight budget policy, and an inflation rate of only about 13 per cent.

But the underlying fear of many Eurobankers is that it will again become hard to distinguish between the relative merits of individual Latin American credits because of the mood of global restraint.

Some bankers were already arguing last week that margins on Eurocredits for European horrorers could start to rise as banks concentrate on improving their return on assets as well as continuing their fight into quality after the Mexican problems.

But this will only become apparent later as European borrowers are still largely inactive because of the summer holidays and overall the market remains rather quiet.

This week attention thus seems likely to remain focused on Mexico which is scheduled to inform its full range of creditor banks of details concerning the moratorium agreement. In September a further meeting will be held with the banks to consider a longer term solution.

Peter Montagnon

INTERNATIONAL BONDS

Selective tone creeps into trading at the end of a hectic week

IT WAS a busy week for the World Bank last week. The Bank found itself issuing securities in dollars, D-marks, Swiss francs and guilders as interest rates headed decidedly lower.

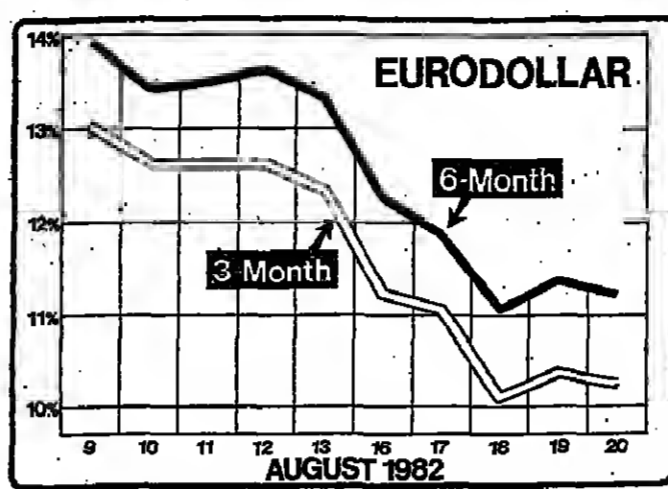
Over the week as a whole six-month Eurodollars shed two points to 11 1/2 per cent, with D-mark rates down 1/2 at 8 1/2 and Swiss franc rates also down 1/2 point at 4 1/2 per cent.

The big impetus for these declines came last Tuesday when Dr Henry Kaufman, Chief Economist at Salomon Brothers, forecast that long-term U.S. bond rates would decline to between 9 and 10 per cent over the next year. Reaction in the bond markets was immediate and Wednesday was one of the most hectic trading days ever as prices of dollar Eurobonds soared.

Despite a mild correction on Thursday prices were still moving ahead on Friday, although by then a distinctly selective tone had crept into trading in the wake of further developments on Mexico's debt problems.

On average, prices were about 1/2 point higher on the day, but individual movements were very mixed as the market sought out quality paper and prices of some bonds issued by U.S. banks actually fell.

A case in point were issues by Manufacturers' Hanover which stepped in briefly to support its paper in the Euro-market on Friday morning, although later in the day business



stabilised with two-way trading in the issues at a level about 1/2 point below the previous close.

Chase Manhattan's floating-rate notes also weakened somewhat, but in general dealers said such a reaction appeared overdone.

Mexican bonds themselves were sharply weaker on the week, particularly on the continent where the latest SwFr 80m issue by Nacional Financiera fell ten points to give a closing yield of 12.17. D-Mark Mexican issues were yielding between 15 and 20 per cent by the end of the week and dollar issues were also lower where traded.

Overall the Eurodollar bond market put on about 3 1/2 points during the week on average

moment, and it is this thought, as well as the anticipation of still lower rates to come, that is clearly holding back borrowers of fixed-rate dollar Eurobonds who issued a total of only \$500m in new paper last week.

The fast moving market last week almost led bankers to forget completely a problem that on Monday had seemed likely to threaten the whole nature of the business.

Proposed new U.S. tax legislation that would have limited the ability of U.S. entities to issue bearer bonds in the Euro-market was redrafted so that such bonds would simply have to carry a warning of the tax implications for U.S. citizens who buy them.

These implications include a provision that capital losses on such bonds are not tax deductible and capital gains must be treated as ordinary income. In addition they impose a reporting requirement if payment of interest is made inside the U.S.

Several bonds which had been held up while the legislation was redrafted were allowed to proceed by mid-week so that by Friday the whole issue had turned out to be a storm in a teacup.

In Germany the capital markets sub-committee agreed on Monday a new issue calendar of 10 issues totalling DM 1.1bn for the coming month.

P.M.

AUSTRALIAN PROJECT FINANCE

Banks may regret relaxing on risks

IT WOULD be a useful exercise for bankers involved in the recent spate of Australian project financings to compare how they described a potential project loan to a borrower and how they described it to their own credit committees. It is likely that there were some differences of emphasis, especially in the area of who was shouldering which risks.

It is too early to judge yet, but there are grounds for suspecting that some banks were so caught up with last year's boom in the Australian mineral and energy industries that they took project risks on their hooks which they may live to regret.

Eighteen months ago, banks were queuing up to lend on Australian projects. The country's political stability and undoubted mineral wealth made it a very attractive credit risk for international banks.

With the presence of several aggressive project advisors, representing the borrowers, and a desire by many banks to demonstrate their "commitment" to Australia in the hope that this might tip the balance when the Government makes up its mind on which foreign banks to allow in, the scene was set for some major advances in the banks' perception of acceptable project risk.

Financings such as Woodside Petroleum, Oaky Creek, and CSR Delhi, broke new ground in regard to the acceptance of project risks by the banks. The question some bankers are now asking themselves is did they go too far?

The recent history of project finance may have lulled some banks into a sense of false security. Throughout the 1970s rising energy prices provided a cushion for the substantial cost over-runs, delays and problems which might otherwise have jeopardised the financing of many of the projects.

There are a number of areas in recent financings where the banks have gone further in accepting project risks than hitherto has been the case.

- Resource risk. Most banks require considerably more reserves to be available than is necessary to repay the project loan. Traditionally, lenders work on the basis of two times cover but the ratio has been reduced in some recent Australian projects to 1.5 times or less.
- Completion risk. Banks have traditionally shied away from accepting the risk that projects will not be completed. However, several recent Australian financings have involved the banks effectively taking this risk on their books. Completion guarantees by the project sponsors have been replaced by weak "completion tests" and there is little to prevent some borrowers from walking away from a project which runs into difficulties.
- Marketing risks. These can be divided into price and volume risks and despite the existence of long-term sales contracts some recent Australian project financings involve the banks taking an increasing risk on these scores.

William Hall

CURRENT INTERNATIONAL BOND ISSUES

Borrowers	Amount m	Maturity	Av. life years	Coupon %	Price	Lead manager	Offer yield %
U.S. DOLLARS							
Schn. Cal. Gas†	50	1989	7	14 1/2	100	Morgan Stanley	14.750
Girozentrale†	50	1989	7	15 1/2	100	CSFB, Morgan Stanley	15.250
Pembroke Capital†	200	1992	10	13 1/2	100	Morgan Stanley	13.750
Norwegian A/S Ex. Fin.††	150	1992	10	13 1/2	100	Merrill Lynch	13.375
Deutsche Fin. NV††	200	1989	7	13 1/2	100	Deutsche Bank, CSFB, Merrill Lynch	13.500
Bank fuer Arbeit und Wirtschaft††	40	1990	8	5 1/2	100	Kidder Peabody	—
Fluor Corp.†	100	1989	7	14	100	Morgan Guaranty	14.000
World Bank†††	250	1987	5	13.45	100	Merrill Lynch	13.450
World Bank†††	100	1992	10	13 1/2	100	Merrill Lynch	13.625
D-MARKS							
Norsk Hydro†	100	1992	10	9	99 1/2	Deutsche Bank	9.078
World Bank†	200	1992	10	9	100	Deutsche Bank	9.000

* Not yet priced. † Final terms. †† Placement. ††† Floating rate note. † Minimum. ‡ Convertible. †† Registered with U.S. Securities and Exchange Commission. Note: Yields are calculated on AIBD basis.

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The Commercial Banking Company of Sydney Limited
SFE Banking Corporation Limited
Union Bank of Switzerland

Australia and New Zealand Banking Group Limited
Commonwealth Trading Bank of Australia
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Australian Industry Development Corporation
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Companies and Markets

INTERNATIONAL CAPITAL MARKETS AND COMPANIES

U.S. BONDS

Yield curve steepens sharply as rally gathers momentum

A BUYING PANIC engulfed the U.S. securities market last week... A dramatic week. Both the stock and bond markets posted sharp price improvements last week... The credit market's euphoria would have been complete had the Federal Reserve Board obliged and cut the discount rate as had been widely expected on Friday.

Table with 3 columns: U.S. INTEREST RATES (%), Week to Aug. 20, Week to Aug. 13. Rows include Fed. Funds, 3-month Treas. bills, 3-month Gov. bonds, AA utility, AA Industrial.

With interest rates already dropping all the markets appeared to need was for the economic gurus to change their tune... The yield curve steepened sharply to record differentials between short and long government bonds... Investors bought treasury

Fokker confident despite sluggish first six months

NET PROFIT at Fokker, the Dutch aerospace company, rose only slightly in the first six months of this year against the same period in 1981... Against this background the Fed funds rate dropped to about 8.5 per cent late in the week from an average of around 10.10 per cent in recent weeks.

Agreement expected on Dome debts

DOMESTIC PETROLEUM, the Canadian energy company, says talks with its bankers on debt restructuring continue, but no agreement has yet been reached... The improvement in Treasury Bill prices which resulted in a drop in yields last week of between four-fifths of a point and two points put the rally on a par with last autumn's bull market.

Greyhound elects new chairman

GREYHOUND CORP. has elected Mr John W. Teets chairman succeeding Mr Gerald E. Trautman who retires... Mr Maurice E. Culbane has been elected president of INLAND STEEL URBAN DEVELOPMENT CORP. (INSTUD), the shelter subsidiary of Inland Steel Co.

INDUSTRIES. Mr Herr joined Colt Industries in 1978 as a representative assigned to Washington, D.C. office.

Mr Michael A. Perlin, vice-president, HARRIS BANK, Chicago, has been named manager of the bank's Singapore branch... Mr Jack E. St. Clair, a member of Raymond International's board of directors since 1978, has resigned.

Loss ahead at Allis Chalmers

ANOTHER "MAJOR LOSS" is expected this year at Allis-Chalmers, the Milwaukee-based machinery manufacturer, chiefly because of production shut-downs at its agricultural equipment plants... In fiscal 1981, Allis suffered a pre-tax loss of \$90m and Wall Street analysts have warned that this year's loss could exceed the 1981 deficit of \$2.85 a share.

Bell Canada rejects plea for inquiry

BELL CANADA, the nation's largest supplier of telecommunications equipment, will not wait for a public inquiry before proceeding with a controversial reorganisation plan... The Montreal-based communications giant announced that it will seek approval from Quebec's Superior Court for its plan despite a plea by the Federal Government's Restrictive Trade Practices Commission for a full public inquiry into the move.

INTERNATIONAL APPOINTMENTS

Mr Peter E. McMenemy, marketing director Textile Fibres Oup (TUK), will be developing... Mr Max E. Bass, president and chief executive officer of M & T Chemicals Inc. has been elected a vice president of TEXASGULF INC. Both Texas Gulf, headquartered in Stamford, CT, and M & T, headquartered in Woodbridge, NJ, wholly-owned subsidiaries of Societe Nationale Elf.

Mr George W. Tarelton, vice-president marketing, Utah International Inc. San Francisco, have been elected vice-chairman.

Mr H. Leighton Steward has been elected senior vice-president exploration and production of THE LOUISIANA AND AND EXPLORATION COMPANY, a new position within the company... Mr Kenneth J. Thygesen, has been named president and chief executive officer of the FEDERAL HOME LOAN MORTGAGE CORP. Mr Thygesen succeeds Mr Phillip R. Brinkerhoff, president since 1977 of the Mortgage Corp., who has become president and chief operating officer of First Charter Financial Corp. and its subsidiary, American Savings and Loan Association of Beverly Hills, California.



Mr P. E. McMenemy, development manager, Du Pont de Nemours International, Geneva, Switzerland. He will be responsible for development of business opportunities for all Du Pont products in the Middle East, Africa and Socialist States.

FT INTERNATIONAL BOND SERVICE

Large table with multiple columns: U.S. DOLLAR STRAIGHTS, YEN STRAIGHTS, OTHER STRAIGHTS, FLOATING RATE NOTES, CONVERTIBLE BONDS, SWISS FRANC STRAIGHTS. Includes bond names, yields, and prices.

Advertisement for AIR-INDIA. Includes logo, text: 'Guaranteed by The Republic of India', 'US\$ 198,000,000', 'Finance for the purchase of three A-300 B4 aircraft and related spare parts from Airbus Industrie.', 'Lead Managed by Lloyds Bank International Limited, Bank of India, Banque Paribas, Deutsche Girozentrale-Deutsche Kommunalbank, State Bank of India, Banque Nationale de Paris, CIBC Limited, Midland Bank plc.', 'US\$ 88,000,000 Eurocurrency Loan', 'Provided by Lloyds Bank International Limited, Paribas Finance Ltd., Midland Bank plc, IBJ International Limited, Societe Generale Bank Limited, Banque Nationale de Paris p.l.c., United Commercial Bank, Bank of India, Canadian Imperial Bank Group, State Bank of India, Indosuez Finance (UK) Limited, Bank of Baroda, Credit du Nord S.A.', 'US\$ 22,000,000 equivalent Sterling Buyer Credit', 'US\$ 44,000,000 equivalent D.M. Buyer Credit', 'US\$ 44,000,000 equivalent FF. Buyer Credit', 'Provided by Midland Bank plc, IBJ International Limited, Canadian Imperial Bank Group, Credit du Nord S.A., Banque Indosuez, Societe Generale Bank Limited, Lloyds Bank Plc, Banque Paribas (London), Deutsche Girozentrale-Deutsche Kommunalbank, Hessische Landesbank Girozentrale, Landesbank Rheinland-Pfalz, Girozentrale, Societe Generale, Bank of Tokyo (Deutschland) A.G., Industriekreditbank A.G., Lloyds Bank International Limited, Kreditanstalt fur Wiederaufbau, Banque Francaise du Commerce Exterieur, Banque Nationale de Paris, Credit Lyonnais, Banque Indosuez, Societe Generale, Citibank, N.A., Lloyds Bank International (France) Limited, Credit du Nord S.A., State Bank of India.', 'Co-ordinated by Lloyds Bank International', 'حکومت الامم المتحدة' logo at the bottom.

WORLD STOCK MARKETS

Handwritten Arabic text: "مركز الأبحاث"

Companies and Markets

NEW YORK

Table of stock prices for various companies in New York, including columns for High, Low, Stock, and Aug 20.

NEW YORK

Table of stock prices for various companies in New York, including columns for High, Low, Stock, and Aug 20.

NEW YORK

Table of stock prices for various companies in New York, including columns for High, Low, Stock, and Aug 20.

CANADA

Table of stock prices for various companies in Canada, including columns for High, Low, Stock, and Aug 20.

INDICES

Table of financial indices including Dow Jones, S&P 500, and other market indicators.

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Notes and disclaimers regarding the data provided, including a note about the individual exchange and the source of the data.

COMPANIES AND MARKETS CURRENCIES, MONEY Y and GOLD

MONEY MARKETS

BY COLIN MILLHAM

A delicate shade of amber

THAT'S A long time in this market... commented a senior manager at one of the discount houses when asked his thoughts on the possibility of bank base rates falling into single figures by late October.

It can only be hoped that Dr Henry Kaufmann of Salomon Brothers... is the man largely responsible for the analogical change in sentiment in the equity markets.

over the appropriate bill rates to relieve money market shortages... Worried about the heavy market sentiment the authorities refused to cut its dealer rates after the fall in base rates.

Although the houses are probably resigned to a rather more gentle fall in rates than seemed possible around the middle of the week, single figure base rates still seem likely by the late autumn.

WEEKLY CHANGE IN WORLD INTEREST RATES

Table showing weekly change in interest rates for various countries including London, New York, Tokyo, and others. Columns include country, rate type, and change.

BANK OF ENGLAND TREASURY BILL TENDER

Table showing Bank of England Treasury Bill tender details for August 20 and August 12, including bid amounts and interest rates.

FT LONDON INTERBANK FIXING

Table showing interbank fixing rates for 6 months U.S. dollars and 5 months U.S. dollars.

LONDON MONEY RATES

Table showing London money rates for various currencies and terms.

The fixing rates (Aug 20) are the arithmetic mean rounded to the nearest one-hundredth of the bid and offered rates for \$100 quoted by the market to five reference banks at 11 am each working day.

EURO-CURRENCY INTEREST RATES (Market closing rates)

Table showing Euro-currency interest rates for various currencies like Sterling, U.S. Dollar, Canadian Dollar, etc.

CURRENCIES AND GOLD

Dollar very weak

The dollar fell sharply last week in reaction to lower U.S. interest rates. The trend began on the previous Friday when the Federal Reserve cut its discount rate.

Bank of England figures fell to 120.2 from 122.4 during the week, and in terms of major currencies the U.S. unit weakened to DM 2.4550 from DM 2.5075.

THE DOLLAR SPOT AND FORWARD

Table showing Dollar spot and forward rates for various currencies.

THE POUND SPOT AND FORWARD

Table showing Pound spot and forward rates for various currencies.

GOLD MARKETS

Table showing Gold market prices for various gold coins and bars.

FORWARD RATES AGAINST STERLING

Table showing forward rates against Sterling for various currencies.

EMS EUROPEAN CURRENCY UNIT RATES

Table showing EMS European Currency Unit rates for various countries.

OTHER CURRENCIES

Table showing exchange rates for various other currencies like Argentine Peso, Australian Dollar, etc.

CURRENCY MOVEMENTS

Table showing currency movements and changes for various currencies.

EXCHANGE CROSS RATES

Table showing exchange cross rates between various currencies.

FT UNIT TRUST INFORMATION SERVICE

AUTHORISED TRUSTS

Large table listing various authorized trusts, their managers, and contact information.

INSURANCES

Table listing various insurance companies and their products, including Life Assurance, Fire Insurance, and Marine Insurance. Includes company names like 'Aberdeen Life Assurance Co. Ltd.' and 'Alliance Assurance Co. Ltd.' with their respective details.

INSURANCE & OVERSEAS MANAGED FUNDS

Main table listing insurance and overseas managed funds. Columns include company names (e.g., 'Life Assur. Co. of Pennsylvania', 'Norwich Union Insurance Group'), fund names, and numerical values representing fund performance or assets.

Table listing offshore and managed funds. Columns include fund names (e.g., 'Guinness Mutual Fund (Guernsey)', 'Henderson Fund Mgmt. Ltd.'), fund types, and numerical values.

OFFSHORE AND OVERSEAS

Table listing offshore and overseas funds, including details on fund names, locations, and performance metrics.

NOTES
Prices are in pence unless indicated and
unless otherwise stated. All prices are
quoted as at 11.30 a.m. on the day of
publication. All prices are subject to
change without notice.

FT SHARE INFORMATION SERVICE

WOLSELEY HUGHES Central to Britain's heating Heating and Plumbing Merchants. Farm and Garden Machinery, Engineering, Plastics.

BRITISH FUNDS

Table of British Funds with columns for Name, Price, and Yield. Includes 'Shorts' (Lives up to Five Years) and 'Five to Fifteen Years'.

Over Fifteen Years

Table of funds categorized as 'Over Fifteen Years'.

Undated

Table of undated funds.

Index-Linked & Variable Rate

Table of index-linked and variable rate funds.

INT. BANK AND O'SEAS GOVT. STERLING ISSUES

Table of international bank and overseas government sterling issues.

CORPORATION LOANS

Table of corporation loans.

COMMONWEALTH AND AFRICAN LOANS

Table of commonwealth and African loans.

LOANS

Table of general loans.

LOANS—Continued

Continuation of loans table.

Building Societies

Table of building societies.

FOREIGN BONDS & RAILS

Table of foreign bonds and rails.

AMERICANS

Table of American stocks.

CANADIANS

Table of Canadian stocks.

BANKS AND HIRE PURCHASE

Table of banks and hire purchase.

BANKS & H.P.—Cont.

Continuation of banks and hire purchase table.

Hire Purchase, etc.

Table of hire purchase and other services.

BEERS, WINES AND SPIRITS

Table of beer, wine, and spirit companies.

BUILDING INDUSTRY, TIMBER AND ROADS

Table of building industry, timber, and roads.

ELECTRICALS

Table of electrical companies.

CHEMICALS, PLASTICS—Cont.

Continuation of chemicals and plastics table.

CHEMICALS, PLASTICS—Cont.

Continuation of chemicals and plastics table.

DRAPERY AND STORES

Table of drapery and stores.

ELECTRICALS—Continued.

Continuation of electrical table.

ENGINEERING

Table of engineering companies.

ENGINEERING MACHINE TOOLS

Table of engineering machine tools.

ENGINEERING MACHINE TOOLS

Table of engineering machine tools.

ELECTRICALS—Continued.

Continuation of electrical table.

ENGINEERING

Table of engineering companies.

ENGINEERING MACHINE TOOLS

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Table of engineering machine tools.

ENGINEERING MACHINE TOOLS

Table of engineering machine tools.

HOTELS AND CATERERS

Table of hotels and caterers.

INDUSTRIALS (Misc.)

Table of industrial companies (miscellaneous).

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INDUSTRIALS (Misc.)

Table of industrial companies (miscellaneous).

U.S. Corporate Information 01-236 9502. Financial Information... and much more now available by return. NEW YORK STOCK EXCHANGE 'AMERICAN STOCK EXCHANGE' OVER-THE-COUNTER MARKET. Includes image of Statue of Liberty.

CHEMICALS, PLASTICS

Table of chemicals and plastics.

CHEMICALS, PLASTICS

Table of chemicals and plastics.

FOOD, GROCERIES, ETC.

Table of food, groceries, etc.

FOOD, GROCERIES, ETC.

Table of food, groceries, etc.

FOOD, GROCERIES, ETC.

Table of food, groceries, etc.

FOOD, GROCERIES, ETC.

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